United States
Department of
Agriculture

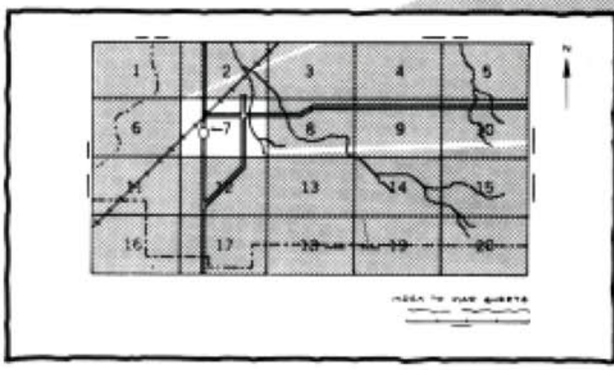
Soil
Conservation
Service

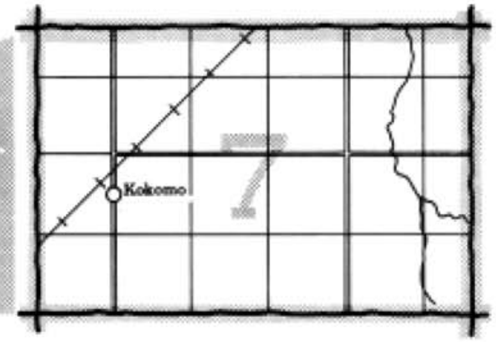
In cooperation with
United States
Department of
Agriculture
Forest Service
and the Oklahoma
Agricultural
Experiment Station

Soil Survey of LeFlore County Oklahoma

HOW TO USE

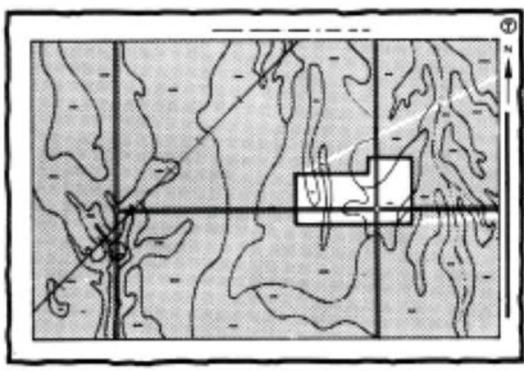
1. Locate your area of interest on the "Index to Map Sheets"

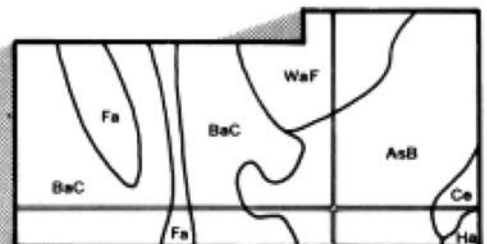




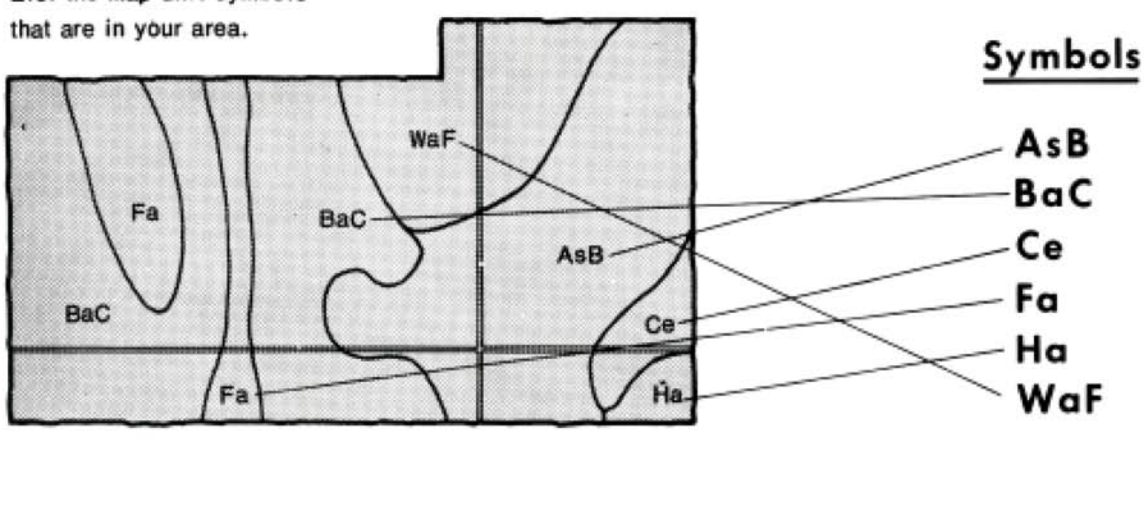
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



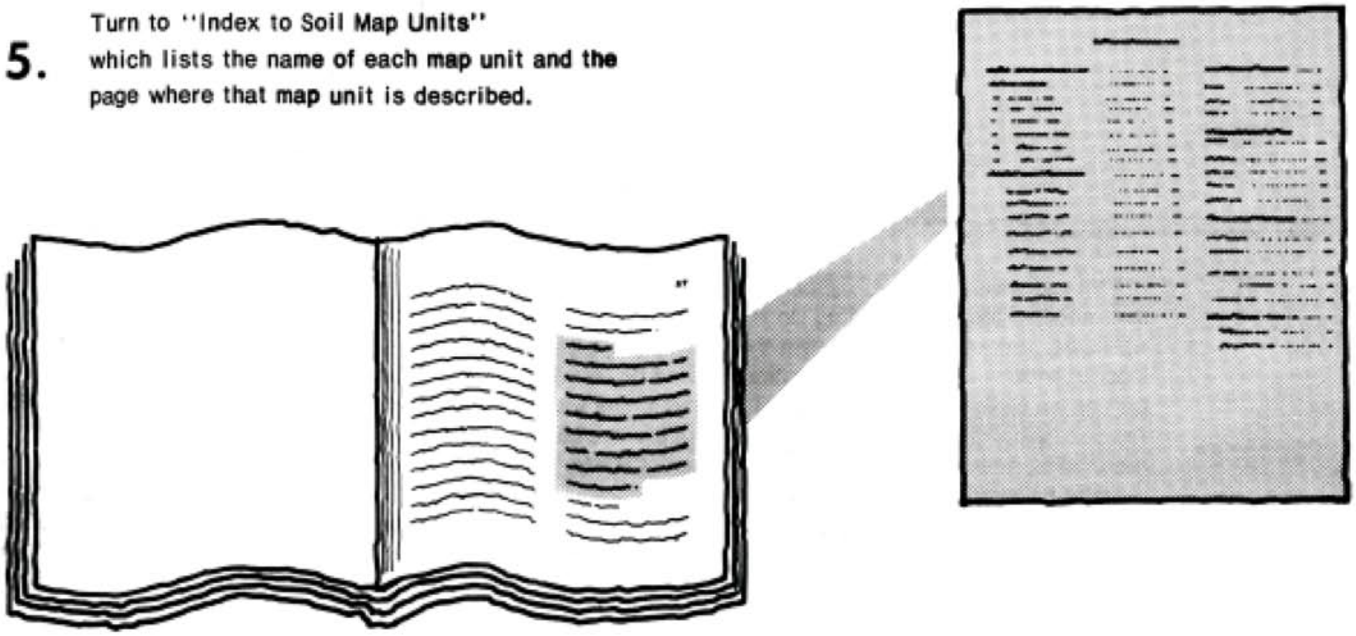


4. List the map unit symbols that are in your area.

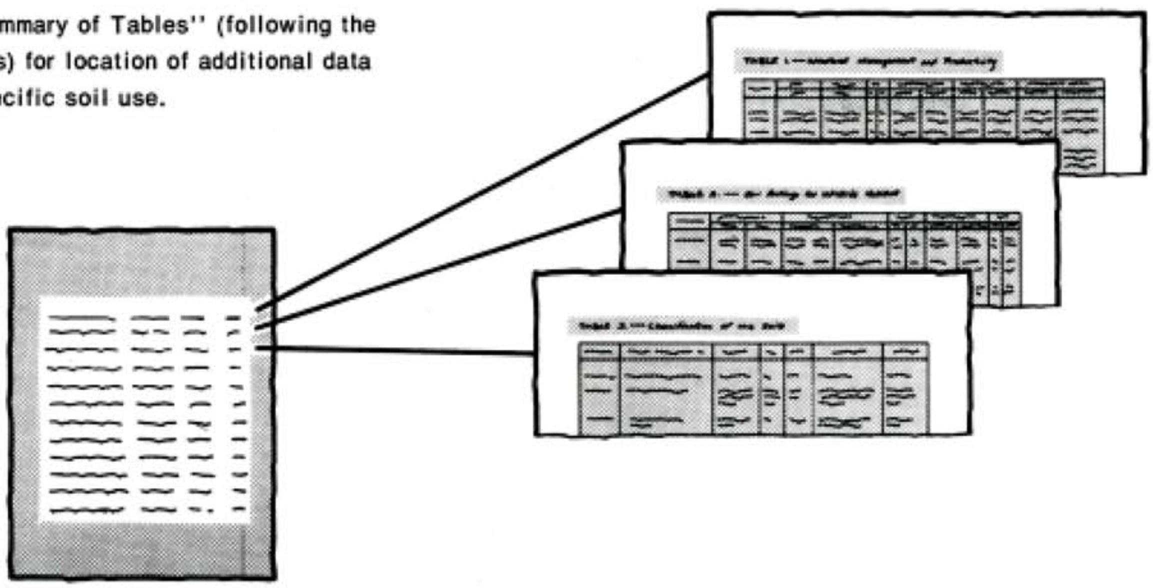


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

The first soil survey of LeFlore County was published in 1931 (*4*). This survey updates and supersedes the first soil survey.

Major fieldwork for this soil survey was completed in 1965-80. Soil names and descriptions were approved in 1981. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1981. This survey was made cooperatively by the Soil Conservation Service, the Forest Service and the Oklahoma Agricultural Experiment Station. It is part of the technical assistance furnished to the LeFlore County Conservation District and the Talihina Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: The scenic beauty of the Ouachita Mountains draws thousands of visitors every year to LeFlore County. The Talimena Drive offers a wide outlook over this area of Carnasaw and Octavia soils, which provide excellent habitat for wildlife.

Contents

Soil series

Issued August 1983

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Summary of tables

Foreword

This soil survey contains information that can be used in land-planning programs in LeFlore County, Oklahoma. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

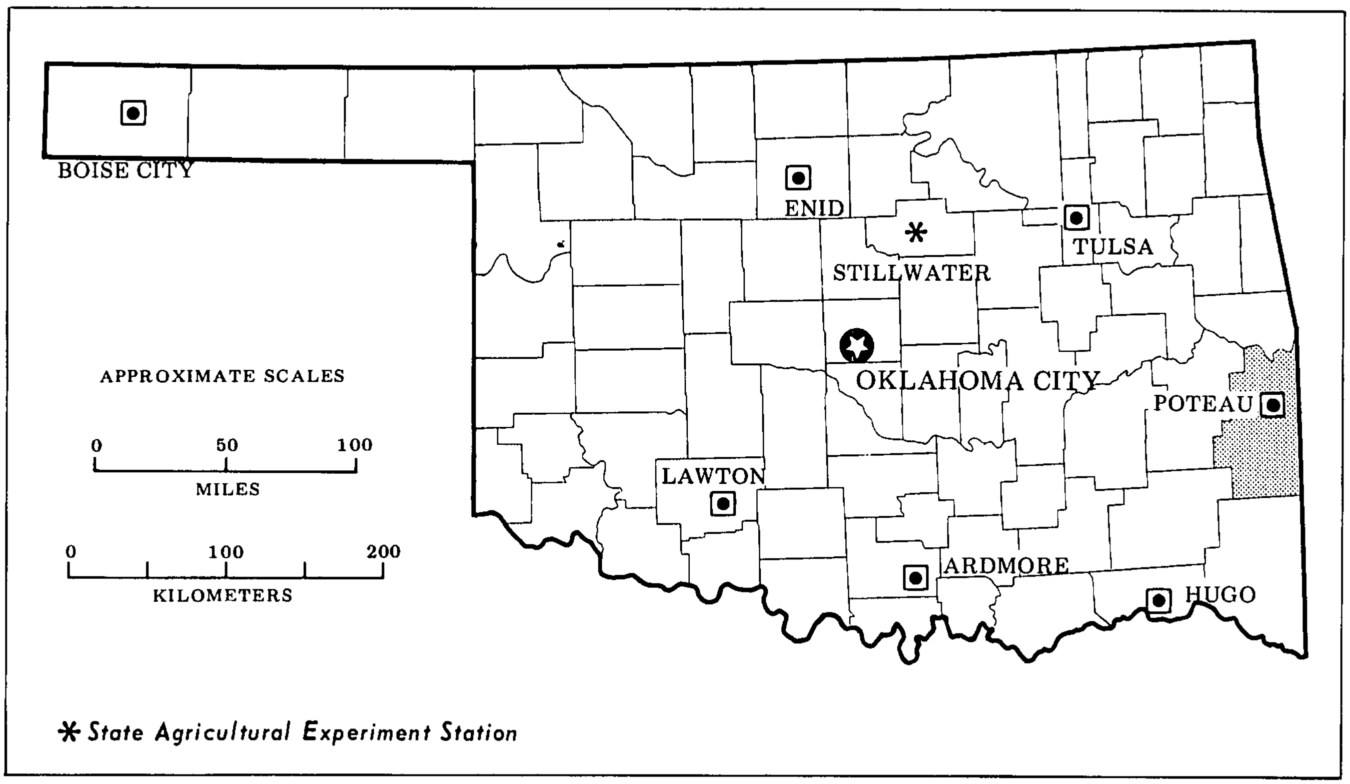
This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Roland R. Willis

Roland R. Willis
State Conservationist
Soil Conservation Service



Location of LeFlore County in Oklahoma.

Soil survey of
LeFlore County, Oklahoma

By Edward J. Abernathy and Karen M. Olszewski, Soil Conservation Service,
and Rodney Peters, Forest Service

United States Department of Agriculture,
Soil Conservation Service and Forest Service
in cooperation with
the Oklahoma Agricultural Experiment Station

LEFLORE COUNTY is in the southeastern part of Oklahoma. Poteau is the county seat. The total area of the county is 1,012,480 acres, or 1,582 square miles. Of this total, Lake Wister and other large areas of water of over 40 acres make up 9,200 acres. The county is bordered by Sequoyah County on the north; by Haskell, Latimer, and Pushmataha Counties on the west; and by McCurtain County on the south. The east side of the county is contiguous with the Arkansas State line.

General nature of the county

This section gives general information concerning the county. It describes physiography, settlement, natural resources, transportation and industry, climate, and landscape resource.

Physiography

LeFlore County is mainly in the Arkansas Valley and the Ouachita Mountains physiographic sections. Topography differences range from the nearly level flood plains of the Arkansas, Poteau, and Kiamichi Rivers and major creeks to the steep mountainous areas in the southern part of the county. Many low ridges are adjacent to the rolling savannah areas in the northern part of the county. Most of the drainage is into the Poteau and Kiamichi Rivers by way of creeks and streams. Nearly all drainage in the northern part of the county is into the Poteau River, which flows into the Arkansas River.

The lowest point in the county is on the Arkansas River and is about 420 feet above sea level. Elevation of the valley areas ranges from 465 feet in the north end of the county to 920 feet in the south end of the county. The ridges and mountains range in elevation from 700 feet to nearly 2,400 feet.

Settlement

LeFlore County, named for Choctaw Chief Greenwood LeFlore, was included in the land claimed for Spain by Columbus in 1492. Later, the county was included in the land claimed for France by LaSalle and sold to the United States in the Louisiana Purchase in 1803.

Early settlement in the county was mainly by Choctaw Indians. Land allotments were made to the Indians on the basis of the cash value of the land. The largest allotments were on the timbered mountain soils. The first Post Office was located at Skullyville in 1833. Poteau was incorporated in 1898 and Spiro in 1899. In 1907 at the time of statehood, the population of the county was about 29,000, and it was about 32,000 in 1970.

Most of the early farmers lived on small farms that provided subsistence. Cotton was the major cash crop, and corn was grown for human and livestock food. In the past 25 years, the trend in farming has been away from cultivation and back to livestock farming. Much of the upland acreage is now planted to tame pasture. The areas still cultivated are mainly in the bottom lands of the Arkansas River. Many of the people now living on farms have part-time jobs. One large reservoir built on the Poteau River is used for recreational and municipal purposes. Some industries have been established.

Natural resources

Soil, water, timber, coal, natural gas, stone, sand and gravel, fish, wild game, and scenic beauty are the main natural resources of the county.

Soil, the most important natural resource in the county, produces pasture and hay, timber, and crops. These are the dominant part of the agricultural economy in the county.

The water source for towns is mainly from reservoirs. Flood control reservoirs furnish recreation and irrigation water. Farm ponds are a source of water for livestock and are used for fish production.

Woodland industries use hardwood and pine timber. Several sawmills and a charcoal plant operate in the southern part of the county. Most of the timber has been cut over, and in many areas the trees left propagate stands of poor quality. Many areas are cut and replanted to pine.

Coal deposits underlie a large portion of the northern part of the county. The coal is mined mainly in strip mine operations.

Many natural gas wells are in production in the northern part of the county. Lease payments and royalties from natural gas production contribute to the economy of the area.

Sandstone is the most common surface rock in the area. It is excavated and used in building construction.

Sand deposits are mainly along the Arkansas River where sand is recovered by dredging operations. Gravel deposits are along local streams near mountainous areas. Sand and gravel are used mainly for aggregates in concrete and for road construction.

Fishes, wildlife, and game are abundant. Crappie, bass, and catfish are the most common fishes in lakes and rivers. The habitat has abundant cover and food for deer, dove, turkey, quail, squirrel, and duck and for fur-bearing animals such as mink, beaver, fox, and bobcat. Resting areas for ducks and other waterfowl are along the Arkansas River and Lake Wister.

Clear-running streams, small ponds, and lakes attract visitors each year. Kerr Reservoir, Lake Wister, and Cedar Lake provide recreational facilities.

Transportation and industry

The county is served by a network of State and Federal highways, railroads, and a navigation system. U.S. Highways 59, 259, and 271 and State Highway 112 cross the county in a north-south direction. U.S. Highway 270 and State Highways 1, 9, 31, 63, 83, and 128 cross the county in an east-west direction. Dirt, gravel, and paved roads in rural areas provide access to State and Federal highways. Railways cross the county from north to south and from east to west. The Arkansas River Navigation System crosses the county along the northern boundary.

Wheat, soybeans, hay, truck crops, wood products, and livestock are marketed in the county and adjacent counties. Sand, gravel, and sandstone are excavated for commercial purposes. Most of the coal and natural gas produced is transported out of the county. Timber industries are located primarily in the southern part of the county. Several glass plants are located in the northern part of the county. Most of the other small commercial industries are near Poteau.

Climate

Prepared by the National Climatic Center, Asheville, N.C.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Poteau in the period 1951 to 1974. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 43° F, and the average daily minimum temperature is 32°. The lowest temperature on record, which occurred at Poteau on Feb. 2, 1951, is -7°. In summer the average temperature is 80°, and the average daily maximum temperature is 93°. The highest recorded temperature, which occurred at Poteau on Aug. 17, 1952, and July 13, 1954, is 111°.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50° F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 44.7 inches. Of this, 26 inches, or about 60 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 7.8 inches at Poteau on May 14, 1968.

The average seasonal snowfall is 4.2 inches. The greatest snow depth at any one time during the period of record was 6 inches. On an average of 2 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 50 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 10 miles per hour, in March.

Tornadoes and severe thunderstorms, which occur occasionally, are local and of short duration. The pattern of damage is variable and spotty.

Landscape resource

David G. Thompson, landscape architect, Soil Conservation Service, helped prepare this section.

The appearance and visual qualities of LeFlore County are important and worthy of inventory, evaluation, and

management. The visual landscape resource is the definable appearance of a landscape unit as determined by its vegetation, water, and manmade structural elements and patterns. As with any resource, landscape resources are finite and should be regarded as worthy of proper management for effective conservation.

Each general soil map unit has a distinct appearance that can be modified by changing the landscape elements or patterns. In some areas, the visual landscape resource is extensively changed by agricultural practices or urban expansion.

In the general soil map units, the visual diversity of the landscape is described and rated. These descriptions are based on a comparison of landscapes within the county and the patterns which are created by the basic landscape elements—landform, vegetation, water, and manmade structures.

Landscape resource elements and patterns are readily visible, and the diversity of that landscape can be rated as high, medium, or low. A landscape which has high visual diversity will have some or all of the following characteristics: variations in landform, unique plant communities, varied vegetative patterns, rivers or streams or both with high clarity, lakes or ponds with diverse shorelines and contrasting manmade structures that are visually compatible with the landscape and other structures.

In areas of low visual diversity, one landscape element may dominate and create an appearance that has little or no contrast in pattern. Low diversity areas may have the following characteristics: landforms with no variety; vegetative cover with no variation in type, height, or color; water bodies with limited visual interest and shorelines with no variety; and manmade structures that have little relation to their surroundings.

When a change in landscape patterns or elements is considered, the potential visual impacts on the landscape should be carefully analyzed. Often a single practice may increase or decrease the visual quality. For example, the grading and revegetating of an eroded area can increase resource quality. A decrease in visual quality is often experienced when the soil behavior of an area is not taken into consideration. For instance, a sloping area which has soil suitable for woodland may be cleared and planted to row crops. The soil may erode severely during winter months if it is not protected by vegetative cover. The result could be bare and unsightly eroded areas, loss of soil, decrease in water quality caused by silty sediment, and loss of other vegetative areas because of increased runoff.

A knowledge of each map unit and of the result that land use changes have on the landscape is necessary to effectively plan for proper management of the area. Assistance in planning is available from the Soil Conservation Service field office. Proper consideration of soil characteristics, land use, and the visual resource helps in conserving the optimum quality of the landscape resources.

How this survey was made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specific uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and often the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area are in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils

in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map unit composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General soil map units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, *the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure.* The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil potential ratings are based on the practices commonly used in the survey area to overcome soil limitations. These ratings reflect the ease of overcoming the limitations. They also reflect the problems that will persist even if such practices are used.

Each map unit is rated for *cultivated crops, tame pasture, native grass, woodland, urban uses, recreation areas,* and *landscape diversity.* Cultivated crops are those grown extensively in the northern part of the county. Tame pasture is introduced pasture plants. Native grass is native to the area. Woodland refers to areas of native or introduced trees. Urban uses include residential, commercial, and industrial developments. Intensive recreation areas are campsites, picnic areas, ballfields, and other areas that are subject to heavy foot traffic. Extensive recreation areas are those used for nature study and as wilderness. Landscape diversity is the comparison of landscape patterns created by landform, water, vegetation, and manmade structures.

Deep, somewhat poorly drained to well drained loamy and clayey soils; on flood plains

The soils in this group make up about 19 percent of the county. The soils are used mainly for field crops and tame pasture.

1. Moreland-Coushatta-Oklared

Nearly level to gently undulating, somewhat poorly drained and well drained loamy and clayey soils that have a loamy or clayey subsoil or that have loamy underlying layers; on flood plains

The landscape of this map unit consists of nearly level to gently undulating areas of soils on flood plains of the Arkansas River. The smooth slopes generally range up to 1 percent, and slopes in the undulating areas of soils are short and irregular and dominantly are 1 to 3 percent. A large acreage has been cleared and is in cultivation.

The nearly level to gently undulating soils provide little variation in landforms. Most of the soils are used for cultivation; the vegetative patterns are broken by drainageways. The water elements consist of the Arkansas River and its tributaries. The dominant structures are the lock and dams on the Arkansas River. Based on these elements, the visual diversity of this unit is medium. Changes in the landscape can be visually significant.

This map unit makes up about 3 percent of the county. It is about 39 percent Moreland soils and similar soils, which include Garton, Latanier, and Lela soils; 33 percent Coushatta soils and similar soils, which include Norwood, Redport, Roxana, and Severn soils; 12 percent Oklared soils; and about 16 percent soils of minor extent.

The somewhat poorly drained, very slowly permeable Moreland soils generally are nearly level; however, some areas are slightly concave. Surface drainage systems commonly are needed. The soils have a dark reddish brown silty clay surface layer and subsoil.

The well drained, nearly level to gently undulating Coushatta soils are moderately permeable. The surface layer is dark brown silt loam, the subsoil is dark reddish brown silt loam and silty clay loam, and the underlying material is reddish brown fine sandy loam in the upper part and reddish yellow loamy fine sand in the lower part.

The well drained, nearly level to gently undulating Oklared soils are moderately rapidly permeable. The surface layer is dark brown fine sandy loam, and the underlying layer is brown fine sandy loam that has layers of loamy fine sand, very fine sandy loam, and finer textured material.

The soils of minor extent include the somewhat poorly drained Lynnville Variant soils. Also included are the excessively drained Crevasse soils and sandy deposits dredged from the Arkansas River, the well drained

Kiomatia soils, and the moderately well drained Wabbaseka soils.

About 95 percent of the acreage of this unit has been cleared and is in cultivation. The major crops are soybeans, wheat, and alfalfa. Some areas are used for spinach, peas, and other specialty crops. The soils are generally high in natural fertility and organic matter content, and crops respond favorably to fertilizer. Lime generally is not needed. The uncleared acreage consists mainly of wet drainageways and sandy areas that remain in mixed hardwoods.

The hazard of erosion is medium in most areas of undulating soils, but the short irregular slopes make terracing impractical. Adequate crop residue helps control water erosion and maintain tilth. In some places surface wetness causes difficulty in tillage, in establishing uniform stands of crops, and in harvesting. Surface drainage systems help remove excess surface water, but they do not completely eliminate internal wetness in the somewhat poorly drained soils. Shallow irrigation wells provide water for some crops.

Because the soils in this map unit are subject to rare flooding, they have low potential for most urban and recreational uses. A lock and dam system on the Arkansas River has greatly decreased, but not eliminated, the frequency of flooding.

2. Neff-Kenn-Ceda

Nearly level to very gently sloping, moderately well drained and well drained loamy soils that have a loamy subsoil or that have cobbly and loamy underlying layers; on flood plains

The landscape in this map unit consists of broad, nearly level to very gently sloping areas of soils on flood plains that are subject to occasional and frequent flooding. Some areas of soils are very gently undulating or slightly depressional. Most soils in this unit are drained by natural drainageways. Slopes range from 0 to 2 percent.

The nearly level to very gently sloping soils in this unit provide little variation in landforms. Vegetative patterns are varied because of the cleared areas and the mixed hardwood and pine forest. Water elements, the rivers and drainageways of the unit, add variety and interest. Structures are few. Based on these landscape elements, visual diversity for this unit is medium. Changes in the landscape can be visually significant.

This map unit makes up about 16 percent of the survey area. It is about 49 percent Neff soils, about 20 percent Kenn soils and similar soils, which include Speer soils, about 15 percent Ceda soils, and about 16 percent soils of minor extent.

The nearly level to very gently sloping, moderately well drained Neff soils are moderately slowly permeable. They have a surface layer of dark brown silt loam. The upper part of the subsoil is dark yellowish brown silt loam, and the lower part is dark yellowish brown silty clay loam that has gray mottles.

The nearly level to very gently sloping, well drained Kenn soils are moderately permeable. They have a dark brown loam surface layer. The upper part of the subsoil is yellowish red clay loam, and the lower part of the subsoil is brown very gravelly clay loam. The underlying material is dark yellowish brown cobbly loam.

The nearly level to very gently sloping, well drained Ceda soils are rapidly permeable. They have a surface layer of brown cobbly loam. The underlying material is strong brown grading to brown cobbly clay loam.

The soils of minor extent are the somewhat poorly drained Cupco and Pocola soils and the well drained Rexor soils. The Pocola soils are on the Poteau River flood plain, about 3 to 6 miles upstream from the common flood plain of the Arkansas and Poteau Rivers.

About 60 percent of the acreage of this unit has been cleared. Most of the cleared acreage is used for tame pasture for beef cattle. Some small acreages are used for soybeans and small grains. Pasture and cultivated crops respond to lime and fertilizer. The uncleared acreage is along narrow drainageways and in wet areas that generally are in mixed hardwoods. Near mountainous areas, some of the uncleared acreage has many stones on the surface and supports a stand of mixed hardwoods and pine.

Potential for crops is medium to low. Excess water is the dominant management problem. Flooding damages crops and fences, and in places seasonal wetness limits accessibility. In places artificial drainage systems are needed to remove surface water. In cultivated areas, crop residue management is needed to maintain tilth.

The soils of this unit are suitable for trees. The moderately well drained and well drained soils have medium potential for hardwoods and pine. Seasonal wetness and flooding restrict the use of logging equipment.

Because of seasonal wetness and the flooding hazard, the potential of these soils for most urban and recreational uses is low.

The soils have high potential for use as habitat for white-tailed deer, squirrel, and cottontail rabbit.

Deep to shallow, well drained stony soils; on ridges and mountains

The soils in this group make up about 55 percent of the county. The soils are used for woodland and recreation.

3. Bengal-Clebit-Pirum

Moderately deep and shallow, very gently sloping to steep, well drained stony soils that have a clayey or loamy subsoil over shale or sandstone; on ridges and mountains

The landscape of this map unit consists of low ridges and mountains in the northern half of the county. The ridges and mountains are linear and irregular in shape. Most areas have stones on the surface. Slopes range from 2 to 60 percent.

The gently sloping to steeply sloping soils provide a great deal of variation in landforms. Woodlands create some vegetative patterns throughout the unit. Farm ponds and drainageways provide water elements. Structures are few. Based on these landscape elements, visual diversity of this unit is high. Most changes on the landscape have little visual significance. Clear-cut timber harvesting can be planned so that the resulting open spaces resemble naturally occurring open spaces.

This map unit makes up about 14 percent of the county. It is about 53 percent Bengal soils, about 21 percent Clebit soils, about 21 percent Pirum soils, and 5 percent soils of minor extent.

Bengal soils are on crests and side slopes of mountains and on low hills. These moderately deep, gently sloping to steep, well drained soils are slowly permeable.

The surface layer is dark brown stony fine sandy loam grading to yellowish brown stony fine sandy loam. The subsoil is yellowish red clay in the upper part and yellowish red shaly clay in the lower part. Soft shale commonly is at a depth of 36 inches.

Clebit soils are on crests and side slopes of mountains and on low ridges. These shallow, very gently sloping to very steep, well drained soils are moderately rapidly permeable. They have a dark brown stony fine sandy loam surface layer and a brown cobbly fine sandy loam subsoil. Hard sandstone bedrock commonly is at a depth of 15 inches.

Pirum soils are on low ridges and mountains. These moderately deep, very gently sloping to very steep, well drained soils are moderately permeable. They have a surface layer of brown stony fine sandy loam. The subsoil is strong brown loam in the upper part and yellowish red sandy clay loam in the lower part. Hard sandstone bedrock commonly is at a depth of 30 inches.

The soils of minor extent are the moderately well drained Shermore soils on foot slopes and the well drained Carnasaw soils on side slopes.

Most areas have stones on the surface and are used as woodland and grazable woodland. This unit has low potential for eastern redcedar, loblolly pine, and shortleaf pine. Concerns in management include controlling hardwoods to allow the establishment and growth of pine, controlling grazing, proper stocking, and preventing wildfires. The steeper slopes restrict the use of logging equipment, and erosion is a hazard along logging roads and skid trails.

About 20 percent of the acreage does not have stones on the surface and has been cleared. It is used for tame pasture for livestock, especially beef cattle. Potential is medium for bermudagrass and low for tall fescue.

Potential of the soils in this unit is low for cultivated crops and most urban and recreational uses. Depth, slope, permeability, and stoniness are the main limitations. This unit has high potential for use as habitat for white-tailed deer, cottontail rabbit, turkey, and squirrel.

4. Carnasaw-Octavia-Pirum

Deep and moderately deep, very gently sloping to steep, well drained stony soils that have a clayey and loamy subsoil over shale or sandstone; on ridges and mountains

The landscape of this map unit consists of mountains and ridges mostly in the southern half of the county. The ridges are linear and irregular in shape, and elevation ranges from about 1,000 to 2,400 feet above sea level. The tilt of the shale and sandstone beds, which is quite variable from ridge to ridge, determines the position of the residual soils on the landscape. Soils in this unit are stony on the surface. Slopes range from 2 to 60 percent.

The very gently sloping to steep soils provide a wide variety of landforms. Vegetative patterns are mixed hardwood and pine forest. Few water elements are in this unit. Structures are few. Based on these landscape elements, the visual diversity of this unit is medium. Changes in the landscape may be visually significant.

This map unit makes up about 41 percent of the survey area. It is about 58 percent Carnasaw soils, about 14 percent Octavia soils, about 12 percent Pirum soils, and 16 percent soils of minor extent.

The deep Carnasaw soils generally are on the upper part of side slopes; in some places they are on crests of ridges and mountains. These deep, gently sloping to very steep, well drained soils are slowly permeable. They have a surface layer of brown stony loam and a subsurface layer of brown gravelly loam. The upper part of the subsoil is yellowish red clay loam, the middle part is red clay, and the lower part is mottled, red and gray clay. The underlying material is gray and yellowish brown soft shale that is partly weathered in the upper part.

Octavia soils are on foot slopes and colluvial benches of mountains. These deep, gently sloping to very steep soils are moderately slowly permeable. They have a surface layer of dark grayish brown stony fine sandy loam and a subsurface layer of yellowish brown stony fine sandy loam. The upper part of the subsoil is strong brown gravelly loam, the middle part is strong brown grading to yellowish red gravelly clay loam, and the lower part is coarsely mottled red, strong brown, and light gray clay.

The moderately deep Pirum soils are on crests and upper side slopes of low-lying ridges and mountains. These very gently sloping to very steep soils are moderately permeable. They have a surface layer of

brown stony fine sandy loam. The upper part of the subsoil is strong brown loam, and the lower part of the subsoil is yellowish red sandy clay loam. The underlying material is hard sandstone bedrock.

The soils of minor extent are the shallow Clebit soils on ridge crests and the moderately deep Bengal soils and the deep Caston and Panama soils on side slopes, foot slopes, and benches of mountains.

Most of the soils in this map unit are used as woodland and grazable woodland and for recreation. This unit has medium potential for shortleaf pine and loblolly pine. Concerns in management include controlling hardwoods to allow establishment and growth of pine, controlling grazing, proper stocking, and preventing wildfires. Steep slopes and surface stoniness restrict the use of logging equipment, and erosion is a hazard along logging roads and skid trails. Hunting, primitive camping, and hiking are the most common recreational uses.

Potential of these soils is low for cultivated crops and most urban uses. Either collectively or individually, slope, soil permeability, and surface stoniness are the main limitations. The soils have high potential as habitat for white-tailed deer, cottontail rabbit, turkey, and squirrel.

Deep to shallow, well drained and moderately well drained sandy and loamy soils; on uplands

The soils in this group make up 26 percent of the county. The soils are mainly used for tame or native grass pasture.

5. Kamie-McKamie

Deep, gently sloping to strongly sloping, well drained sandy and loamy soils that have a loamy or clayey subsoil; on stream terraces

The landscape of this map unit consists of smooth and convex old stream terraces by the Arkansas River flood plain. In some areas erosion has thinned the surface layer and has created rills and a few gullies. Slopes dominantly are 3 to 8 percent but range to 12 percent.

The gently sloping to strongly sloping soils provide little variation in landform. Scattered woody vegetation and tame pasture provide vegetative patterns that have some contrast. Water elements in this unit include farm ponds, drainageways, and streams. Structures are few but significant. Based on these landscape elements, the visual diversity of this unit is medium. Changes in the landscape can be visually significant.

This map unit makes up about 1 percent of the survey area. It is about 66 percent Kamie soils, about 18 percent McKamie soils, and about 16 percent soils of minor extent.

Kamie soils are on old stream terraces. These gently sloping to sloping, well drained soils are moderately permeable. They have a surface layer of brown loamy fine sand. The upper part of the subsoil is yellowish red sandy clay loam, and the lower part is yellowish red fine sandy loam.

McKamie soils are on old stream terraces. These gently sloping to strongly sloping, well drained soils are very slowly permeable. They have a surface layer of brown loam. The upper part of the subsoil is red clay, and the lower part is red silty clay loam.

The soils of minor extent are the moderately well drained Shermore soils. The Shermore soils are very gently sloping to sloping and commonly are gullied by erosion.

Most of the acreage of this unit has been cleared and is in tame pasture. Raising beef cattle is the main farm enterprise. Overgrazing of the pastures causes rapid development of erosion and gullying. These soils have low potential for cultivated crops and sown crops. Slope and its hazard of erosion are the main limitations. Crops respond favorably to fertilizer and lime.

The moderately permeable Kamie soils have medium potential for most sanitary facilities and high potential for most building site development and recreational uses. Low strength and seepage are limitations for some uses, but they can be overcome by proper design and installation. The soils of this unit have medium potential for pine and red oak trees. Potential is high for use of these soils as habitat for wildlife.

The very slowly permeable McKamie soils have low potential for most urban and recreational uses. Potential is high for use of these soils as habitat for wildlife. Potential is low for sanitary facilities and building site development because of the very slow permeability, the high shrink-swell potential, and the low strength of these soils.

6. Sallisaw-Stigler

Deep, nearly level to moderately steep, well drained and moderately well drained loamy soils that have a loamy or clayey subsoil; on uplands

The landscape in this map unit is broad uplands interspersed with short side slopes. These uplands are high terraces adjacent to local streams and alluvial fans adjacent to mountainous areas. The short side slopes are narrow breaks or steps from one broad alluvial plain to another of different elevation, and they have stones on the surface. Slopes generally are 0 to 5 percent but range to about 15 percent on the short side slopes.

The nearly level to moderately steep soils provide some variation in landforms. Vegetation on most soils is tame pasture; some hardwood and pine stands are located on the steeper stony soils. There are farm ponds and streams. Structures are few but visually significant. Based on these landscape elements, the visual diversity of this unit is high. Changes in the landscape may not be visually significant.

This map unit makes up about 4 percent of the survey area. It is about 82 percent Sallisaw soils, about 13

percent Stigler soils, and about 5 percent soils of minor extent.

Sallisaw soils are on smooth stream terraces and local alluvial terraces. These very gently sloping to moderately steep, well drained soils are moderately permeable. Typically, the surface layer is reddish brown loam. The upper part of the subsoil is red loam, the middle part is red clay loam, and the lower part is reddish yellow very gravelly clay loam. The sloping to moderately steep Sallisaw soils are on short side slopes. They are similar to the Sallisaw soils in broad, smooth areas except that they have a stony loam surface layer.

Stigler soils are in broad, gently rolling areas and in narrow valleys. These nearly level to very gently sloping, moderately well drained soils are very slowly permeable. They have a surface layer of dark grayish brown silt loam and a subsurface layer of grayish brown silt loam. The upper part of the subsoil is yellowish brown silty clay that has red and grayish brown mottles. The lower part of the subsoil is mottled, yellowish brown and gray silty clay.

The soils of minor extent are the moderately well drained Wister soils in broad, smooth areas and the well drained Pirum and Clebit soils on side slopes of low ridges.

About 90 percent of the acreage of this unit has been cleared and is used for tame pasture. Raising beef cattle is the main farm enterprise. A few areas are used for soybeans and small grains. The hazard of erosion is the main limitation for crops. Terracing, contour tillage, and crop residue management are needed for cultivated areas. The uncleared acreage is primarily steeper, stony areas that generally support a stand of mixed hardwoods and pine.

Potential of these soils is medium for tame pasture grasses, clovers, cultivated crops, and small grains. The potential is medium for southern red oak and shortleaf pine. During wet seasons, equipment use is restricted in areas of Stigler soils. Erosion is a hazard along logging roads and skid trails.

The moderately permeable Sallisaw soils have high potential for building side development and recreational uses and medium potential for sanitary facilities. Permeability and seepage are limitations for some uses, but they can be overcome by proper design and installation.

The very slowly permeable Stigler soils have low potential for most urban and recreational uses. Seasonal wetness, the shrink-swell potential, and the very slow permeability are the main limitations.

7. Sherless-Wetsaw-Bengal

Deep and moderately deep, very gently sloping to moderately steep, well drained and moderately well drained loamy soils that have a loamy subsoil over sandstone, alluvium, or shale; on uplands

The landscape in this map unit consists of nearly level to very gently sloping old terraces and very gently sloping to moderately steep toe slopes and low-lying ridges. It is primarily in the Octavia valley and the Kiamichi River valley in the southern part of the county. Slopes range from 1 to 15 percent.

The very gently sloping to moderately steep soils provide a variation in landforms. Vegetation patterns are varied by crops, tame pasture, and woodlands. Streams and ponds give some variation to the water resource. Structures are few. Based on these landscape elements, the visual diversity of this unit is high. Changes in the landscape may not be visually significant.

This map unit makes up about 4 percent of the survey area. It is about 44 percent Sherless soils, about 33 percent Wetsaw soils, about 19 percent Bengal soils, and about 4 percent soils of minor extent.

Sherless soils are on low-lying ridgetops and side slopes of uplands. These moderately deep, gently sloping to moderately steep, well drained soils are moderately permeable. They have a surface layer of very dark grayish brown gravelly fine sandy loam and a subsurface layer of yellowish brown gravelly fine sandy loam. The upper part of the subsoil is yellowish red gravelly clay loam, and the lower part of the subsoil is strong brown gravelly clay loam. The underlying material is fractured soft sandstone.

Wetsaw soils are on alluvial benches and stream terraces in valleys of the Ouachita Mountains. These deep, very gently sloping to gently sloping, moderately well drained soils are slowly permeable. They have a very dark grayish brown fine sandy loam surface layer and a yellowish brown loam subsurface layer. The subsoil is strong brown loam in the upper part and mottled, gray, brownish yellow, and red very gravelly clay loam in the middle part; the lower part of the subsoil is mottled, yellowish brown, light gray, and red clay.

Bengal soils are on low-lying crests and side slopes of uplands. These moderately deep, gently sloping to moderately steep, well drained soils are slowly permeable. They have a dark brown loam surface layer that grades to yellowish brown in the lower part. The subsoil is yellowish red clay that has brown and gray mottles at a depth of about 30 inches. The underlying material is gray and yellowish brown soft shale.

The soils of minor extent are soils similar to the Wetsaw and Bengal soils except that they are cobbly or stony on the surface. Other minor soils are the deep Sallisaw and Stigler soils.

About half of the acreage of this unit has been cleared and is in tame pasture. Raising beef cattle is the main farm enterprise. Potential of these soils is medium for most tame pasture plants. Crops respond favorably to fertilizer and lime. Potential of these soils is low for cultivated crops. Slope, wetness, and the hazard of erosion are the main limitations.

About half of the acreage of this unit is in woodland. Potential of these soils is medium for shortleaf pine and loblolly pine. There are no significant limitations for woodland use and management.

These soils have medium potential for most urban and recreational uses. Potential is high for use of these soils as habitat for white-tailed deer, cottontail rabbit, bobwhite quail, turkey, and mourning dove.

8. Stigler-Shermore-Wister

Deep, nearly level to sloping, moderately well drained loamy soils that have a loamy or clayey subsoil over colluvium or shale; on uplands

The landscape of this map unit consists of nearly level to gently sloping broad valley floors and very gently sloping to sloping foot slopes of low ridges. Slopes range from 0 to 8 percent. The soils in this unit formed primarily under savannah vegetation.

The very gently sloping to sloping soils provide little variation of the landforms of this unit. Vegetation is mainly native grasses and tame pasture. Water resource is limited to drainageways. Structures are few. Based on these landscape elements, the visual diversity of this unit is medium.

This unit makes up about 15 percent of the survey area. It is about 48 percent Stigler soils and similar soils, including Vian soils, about 24 percent Shermore soils, about 14 percent Wister soils, and about 14 percent soils of minor extent.

The Stigler soils are in broad, rolling areas and in narrow valleys. They are nearly level to very gently sloping, moderately well drained soils that are very slowly permeable. The surface layer is dark grayish brown silt loam, and the subsurface layer is grayish brown silt loam. The subsoil is mottled, yellowish brown and gray silty clay.

The Shermore soils are on colluvial foot slopes of low ridges that are adjacent to the broad rolling areas. They are very gently sloping to sloping, moderately well drained soils that are moderately slowly permeable. The surface layer is brown fine sandy loam. The upper part of the subsoil is strong brown loam; the middle part is coarsely mottled, strong brown, red, and gray clay loam; and the lower part of the subsoil is yellowish brown clay loam.

The Wister soils are in broad, smooth areas and in narrow valleys. These deep, nearly level to gently sloping, moderately well drained soils are very slowly permeable. The surface layer is brown silt loam. The subsoil is dark yellowish brown silty clay in the upper part and mottled, yellowish brown and gray silty clay in the lower part over soft shale.

Soils of minor extent are the moderately deep Cowton soils on low ridges and the deep Wing soils, along small drainageways, that have a high sodium content in the subsoil. Also included are the deep, shaly Kanima soils on strip mine pit spoil banks and soils similar to the Stigler soils on low, circular mounds.

About 75 percent of the soils in this unit are in tame pasture and native grass meadow. A few areas are in soybeans and small grains. Both tame pasture and cultivated crops respond favorably to fertilizer and lime. Native vegetation mainly is mid and tall grasses and a few scattered hardwood trees.

The dominant management problem in broad, smooth areas is removing excess surface water. Because of wetness in winter and spring, these soils have medium to low potential for cultivated and sown crops. If row crops are grown on sloping soils, terracing and contour farming are needed to control erosion. Mounded areas that are too irregular for terracing are better suited to tame pasture or sown crops. Crop residue management is needed to help maintain tilth.

The soils of this unit have low potential for woodland. The clayey subsoil restricts root development, and seasonal wetness restricts equipment use.

Because of seasonal wetness and the high shrink-swell potential, the soils of this unit have low potential for most urban and recreational uses. Potential is high for use of these soils as habitat for bobwhite quail, mourning dove, and cottontail rabbit.

9. Tuskahoma-Wister

Shallow and deep, nearly level to moderately steep, moderately well drained stony and loamy soils that have a clayey subsoil over shale; on uplands

The landscape in this map unit consists of low ridges and broad uplands in valleys in the southern part of the county. Most areas, except the low ridges, have circular mounds that are 1 to 2 feet high and 30 to 100 feet in diameter. Some areas on the low ridges have stones on the surface. The ridges are linear and irregular in shape and are adjacent to the broad, rolling areas. Slopes range from 0 to 15 percent. The soils of this unit formed under savannah vegetation.

The nearly level to moderately steep soils provide a variation of landforms in this unit. Vegetation consists of native grasses and tame pasture and scattered stands of hardwoods. Structures are few. Based on these landscape elements, the visual diversity of this unit is medium.

This unit makes up about 2 percent of the survey area. It is about 69 percent Tuskahoma soils, about 26 percent Wister soils, and about 5 percent soils of minor extent.

The shallow, very gently sloping to moderately steep, moderately well drained Tuskahoma soils are very slowly permeable. They are on low ridges in broad valleys. The surface layer is dark grayish brown stony loam. The upper part of the subsoil is brown clay, and the lower part is dark gray shaly clay. The underlying material is soft shale.

The deep, nearly level to gently sloping, moderately well drained Wister soils are very slowly permeable. They are on broad, smooth areas in broad valleys. They have a surface layer of brown silt loam. The subsoil is dark yellowish brown silty clay in the upper part and mottled, yellowish brown and gray silty clay in the lower part. The underlying material is soft shale.

The soils of minor extent are the moderately well drained Wing soils along small drainageways. The subsoil of these soils is high in content of sodium.

Most of the soils in this unit are in tame pasture or native grasses. Some areas support an open stand of winged elm, post oak, blackjack oak, and redcedar. Tame pasture responds favorably to lime and fertilizer.

Excess surface water is the dominant management problem in the broad, rolling areas. These soils have medium potential for pasture and crops. Potential is low for pasture and crops on low ridges because of shallow depth and droughtiness. Surface stoniness in some areas interferes with seedbed preparation and makes establishment of tame pasture grasses very difficult.

This unit is not suited to commercial woodland because of the restricted rooting depth. Potential of these soils is low for most urban uses, habitat for wildlife, and recreational uses. The high shrink-swell potential and wetness are the main limitations. In addition, Tuskahoma soils are shallow and have a stony surface.

Detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Sallisaw loam, 1 to 3 percent slopes, is one of several phases in the Sallisaw series.

Some map units are made up of two or more major soils. These map units are called soil complexes, soil associations, or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Kenn-Ceda complex, occasionally flooded, is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Bengal-Clebit association, strongly sloping, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Neff and Rexor silt loams, frequently flooded, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rubble land is an example. Miscellaneous areas are shown on the soil maps as part of a soil complex with Ceda soils. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil descriptions

1—Bengal stony fine sandy loam, 15 to 35 percent slopes. This moderately deep, well drained, moderately steep to steep soil is on side slopes of low hills and mountains in the northern half of the county. Sandstone cobbles and stones cover 2 to 40 percent of the surface. Areas are 20 to 800 acres.

Typically, the surface layer to about 5 inches is very dark grayish brown stony fine sandy loam in the upper part grading to brown stony loam in the lower part. The upper part of the subsoil to about 22 inches is red and yellowish red clay and has brown and gray mottles beginning at a depth of about 14 inches; the lower part

is yellowish red, mottled shaly clay to about 29 inches. The underlying material is gray and yellowish brown soft shale.

This soil is low in natural fertility and organic matter content. It is strongly acid or medium acid in the surface layer and very strongly acid or strongly acid in the subsoil. Permeability is slow, and the available water capacity is medium.

Included in mapping are a few areas, mostly on foot slopes, of Octavia and Caston soils. Also included are a few areas, mostly near ridgetops, of Clebit soils. The included soils make up about 10 to 20 percent of the map unit, but individual areas generally are less than 3 acres.

This soil is used as woodland or grazable woodland. Because of stones on the surface and steep slopes, this soil has low potential for cultivated crops and tame pastures.

This soil has medium potential for native grasses. Controlling brush, proper grazing, and preventing wildfires help maintain or improve the quantity and quality of native grass.

This soil has low potential for eastern redcedar, loblolly pine, and shortleaf pine. Concerns in management are controlling hardwoods to allow establishment and growth of pine, controlling grazing, proper stocking, and preventing wildfires. Slopes are steep enough to cause an erosion hazard. The use of logging equipment is limited because of the stones on the surface and steep slopes.

This soil has low potential for most urban uses because of the slow permeability, the high shrink-swell potential, stoniness, and slope. The potential is also low for camp areas, picnic areas, and playgrounds.

This soil has high potential as habitat for white-tailed deer, turkey, and squirrel.

This Bengal soil is in capability subclass VIIs, woodland suitability group 5x3, and Sandy Savannah range site.

2—Bengal-Clebit association, strongly sloping. This unit consists of moderately deep Bengal soils and shallow Clebit soils in a regular and repeating pattern. The landscape is low hills and lesser sloping mountaintops. Slopes range from 4 to 18 percent. The Bengal soils are on side slopes and occasionally on crests. The Clebit soils are on crests and occasionally on side slopes where the interbedded sandstone is near the surface. Areas are 50 to 900 acres. Individual areas of each soil range from 2 to 200 acres.

The Bengal soils make up about 75 percent of the map unit. Typically, the surface layer is about 7 inches thick and is dark brown stony fine sandy loam in the upper part grading to yellowish brown stony fine sandy loam in the lower part. The upper part of the subsoil is yellowish red clay to about 22 inches; the middle part is yellowish red, mottled clay to about 30 inches; and the lower part is yellowish red, mottled shaly clay to about 36 inches. The underlying material is gray and yellowish brown soft shale.

The well drained Bengal soils have slow permeability. The available water capacity is medium. Natural fertility and organic matter content are low. Reaction is medium acid or strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil.

The Clebit soils make up about 15 percent of the map unit. Typically, the surface layer is very dark grayish brown stony fine sandy loam about 4 inches thick. The subsoil is brown cobbly fine sandy loam to about 13 inches. The underlying material is hard sandstone bedrock.

The well drained Clebit soils have moderately rapid permeability. Natural fertility and organic matter content are low. The available water capacity is low. Reaction is slightly acid to strongly acid in the surface layer and slightly acid to very strongly acid in the subsoil.

Other soils included in mapping are a few intermingled areas of Pirum soils and soils that are similar to Bengal soils except that they have a layer of sandstone within the soil or are underlain by sandstone bedrock. These soils make up about 10 percent of the map unit. Individual areas generally are less than 5 acres.

Most of the soils are used as woodland or grazable woodland. Because sandstone cobbles and stones on the surface interfere with seedbed preparation, these soils have low potential for cultivated crops or tame pastures.

Bengal soils have medium potential for native grass, and Clebit soils have low potential. Controlling brush, proper grazing, and preventing wildfires help maintain or improve the quality and quantity of native grass.

Bengal soils have low potential for loblolly pine and shortleaf pine. Because of shallow depth, Clebit soils have low potential for woodland. Concerns in management include controlling hardwoods to help the establishment and growth of pine, controlling grazing, proper stocking, and preventing wildfires.

These soils have low potential for most urban uses because of depth, slow permeability, the high shrink-swell potential, and stoniness. They have low potential for use as camp areas and playgrounds and medium potential for picnic areas.

These soils have high potential as habitat for white-tailed deer, turkey, and squirrel.

These Bengal and Clebit soils are in capability subclass VIIs and in woodland suitability group 5x2. Bengal soils are in Sandy Savannah range site, and Clebit soils are in Shallow Savannah range site.

3—Bengal-Octavia complex, 15 to 40 percent slopes. This map unit consists of small areas of Bengal and Octavia soils so intermingled that they could not be separated at the scale selected for mapping. They are well drained, moderately deep or deep soils. These soils

are on a series of long, narrow, parallel benches on side slopes. Bengal soil commonly is on the steeper, narrower slopes between benches. However, it is also on some benches on upper slopes that have received little colluvium. Octavia soil commonly is on benches. However, because of extensive colluvial influence, it is also on slopes between benches in some lower slope positions. Areas are 40 to 600 acres. Individual areas of each soil are 1/4 acre to 3 acres.

Bengal stony fine sandy loam makes up about 50 percent of the map unit. Typically, the surface layer is about 3 inches thick and is very dark grayish brown stony fine sandy loam. The upper part of the subsoil is strong brown stony clay loam and yellowish red and red clay to about 22 inches; the lower part is mottled, red, pink, and light gray shaly clay to about 36 inches. The underlying material is soft gray shale with thin layers of gray clay.

Bengal soil is low in natural fertility and organic matter content. It is medium acid or strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is slow, and the available water capacity is medium.

Octavia stony loam makes up about 35 percent of the map unit. Typically, the surface layer is brown stony loam about 4 inches thick. The subsurface layer is brown stony loam about 3 inches thick. The upper part of the subsoil is strong brown gravelly loam to about 12 inches; the middle part is yellowish red clay loam, red clay loam, and red clay to about 38 inches; and the lower part is mottled red and gray clay and shaly clay to about 65 inches.

Octavia soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is moderately slow, and the available water capacity is medium. The root zone is deep, and, except for sandstone fragments, it is easily penetrated by plant roots.

Included in mapping are intermingled areas of soils that are similar to the Bengal soil except that they have a clayey subsoil that extends to a depth of 50 to 70 inches. Also included are soils that are similar to the Octavia soil except that they have a clay loam subsoil that contains more than 35 percent by volume of fragments of sandstone. These included soils make up about 15 percent of this map unit. Individual areas generally are less than 1 acre.

These soils are used mainly as woodland. Bengal soil has low potential for loblolly pine and shortleaf pine. Octavia soil has medium potential for shortleaf pine, loblolly pine, and northern red oak. Concerns in management are controlling hardwoods to help the establishment and growth of pine, preventing wildfires, and controlling erosion in cutover areas. Revegetation of unused logging roads helps control erosion.

These soils have low potential for cultivated crops, pasture, recreation, native grass, and most urban uses. Stoniness and slope are the main limitations.

These soils have high potential as habitat for white-tailed deer, squirrel, and turkey.

These Bengal and Octavia soils are in capability subclass VIIs. They are not assigned to a range site. Bengal soil is in woodland suitability group 5x2, and Octavia soil is in woodland suitability group 4x8.

4—Bengal-Octavia-Tuskahoma complex, 4 to 20 percent slopes. This map unit consists of small areas of Bengal, Octavia, and Tuskahoma soils that are so intermingled that they could not be separated at the scale selected for mapping. They are well drained or moderately well drained and moderately deep, deep, or shallow soils. These soils are on low ridges in the Kiamichi River valley. Bengal soil is on crests and side slopes; Octavia soil is on crests and toe slopes; and Tuskahoma soil is in all positions on the landscape. Areas are 10 to 1,000 acres or more. Individual areas of each soil are 1/2 acre to 5 acres.

The well drained, moderately deep Bengal stony loam makes up about 60 percent of the map unit. Typically, the surface layer is dark grayish brown stony loam about 7 inches thick that grades to yellowish brown stony loam. The upper part of the subsoil is reddish brown clay to about 22 inches, and the lower part is mottled, light gray shaly clay to about 34 inches. The underlying material is grayish shale.

Bengal soil is low in natural fertility and organic matter content. It is medium acid or strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is slow, and the available water capacity is medium.

The deep, well drained Octavia stony fine sandy loam makes up about 15 percent of the map unit. Typically, the surface layer is very dark gray stony fine sandy loam about 3 inches thick. The subsurface layer is yellowish brown stony fine sandy loam to about 6 inches. The upper part of the subsoil is strong brown fine sandy loam to about 30 inches; the middle part is yellowish red clay loam to about 36 inches; and the lower part is coarsely mottled, red, brownish yellow, and light gray clay to about 65 inches.

Octavia soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is moderately slow, and the available water capacity is medium.

The shallow, moderately well drained Tuskahoma stony loam makes up about 10 percent of the map unit. Typically, the surface layer is dark grayish brown stony loam about 4 inches thick. The subsoil extends to about 15 inches. The upper part is yellowish brown clay, and the lower part is grayish brown shaly clay. The underlying material is soft gray shale.

Tuskahoma soil is low in natural fertility and organic matter content. Reaction is medium acid to mildly alkaline in the surface layer and the lower part of the subsoil and strongly acid to neutral in the upper part of

Figure 1.—In an area of Bengal-Octavia-Tuskahoma complex, 4 to 20 percent slopes, the moderately deep Bengal soils and deep Octavia soils support primarily shortleaf pine. The shallow Tuskahoma soils are sparsely vegetated with redcedar, post oak, blackjack oak, winged elm, and native grasses.

the subsoil. Permeability is very slow, and the available water capacity is low.

Included in mapping are small areas of Caston, Panama, and Wetsaw soils. The included soils make up about 15 percent of the map unit. Individual areas generally are less than 5 acres.

Most of these soils are used as grazable woodland or woodland (fig. 1). Bengal and Tuskahoma soils have low potential and Octavia soil has medium potential for shortleaf pine and loblolly pine. Surface stoniness is a moderate limitation to management. Concerns in management are controlling growth of hardwood trees to allow establishment of pine, controlling grazing, proper stocking, and preventing wild fires.

Because of surface stoniness, slope, and soil depth, these soils have low potential for tame pasture and cultivated crops.

Bengal and Octavia soils have medium potential for native grass, and Tuskahoma soil has low potential. Controlling brush, proper grazing, and preventing wildfires help maintain or improve the quantity and quality of native grass.

Because of soil depth, permeability, the high shrink-swell potential, and surface stoniness, these soils have low potential for most urban and recreational uses.

These soils have high potential as habitat for white-tailed deer, turkey, and squirrel.

These Bengal, Octavia, and Tuskahoma soils are in capability subclass VIIs. Bengal soil is in woodland suitability group 5x2 and Sandy Savannah range site; Octavia soil is in woodland suitability group 4x8 and Sandy Savannah range site; and Tuskahoma soil is in

woodland suitability group 5x0 and Shallow Savannah range site.

5—Bengal-Pirum-Clebit complex, 5 to 15 percent slopes. This map unit consists of small areas of Bengal, Pirum, and Clebit soils so intermingled that they could not be separated at the scale selected for mapping. They are well drained, moderately deep to shallow soils. These soils are on crests and side slopes of mountains and low ridges, primarily in the northern half of the county. The Bengal and Pirum soils are on side slopes and occasionally on crests. The Clebit soil is on crests and occasionally on side slopes where the interbedded sandstone is near the surface. Areas are 10 to 1,000 acres. Individual areas of each soil are 1/4 acre to 5 acres.

The moderately deep Bengal fine sandy loam makes up about 30 percent of the map unit. Typically, the surface layer is dark brown fine sandy loam about 4 inches thick. The subsoil extends to about 33 inches. It is yellowish red clay in the upper part, red clay in the middle part, and mottled, yellowish brown, red, and gray shaly clay in the lower part. The underlying material is yellowish brown and black soft shale.

Bengal soil is low in natural fertility and organic matter content. It is medium acid or strongly acid in the surface layer and is strongly acid or very strongly acid in the subsoil. Permeability is slow, and the available water capacity is medium.

The moderately deep Pirum fine sandy loam makes up about 30 percent of the map unit. Typically, the surface layer is brown fine sandy loam about 6 inches thick. The subsoil extends to about 30 inches; the upper part is strong brown loam, and the lower part is yellowish red sandy clay loam. The underlying material is hard sandstone.

Pirum soil is low in natural fertility and organic matter content. It is acid throughout except where the surface has been limed. Permeability is moderate, and the available water capacity is low.

The shallow Clebit gravelly fine sandy loam makes up about 30 percent of the map unit. Typically, the surface layer is brown gravelly fine sandy loam about 4 inches thick. The subsoil is strong brown cobbly fine sandy loam to about 16 inches. The underlying material is hard sandstone.

Clebit soil is low in natural fertility and organic matter content. It is acid throughout except where the surface has been limed. Permeability is moderately rapid, and the available water capacity is low.

Included in mapping are small areas of Shermore soils on foot slopes and small, intermingled areas of soils that have stones in the surface layer. The included soils make up about 10 percent of this map unit. Individual areas generally are less than 3 acres.

Most of these soils are used for pasture; some areas are used as woodland. Because of surface stoniness in some places, slope, and shallowness in some places, the potential for cultivated crops is low. These soils have medium potential for bermudagrass and bahiagrass and low potential for tall fescue. Adapted legumes are arrowleaf clover, hop clover, and Korean, Kobe, and sericea lespedezas. Fertilizer and lime are beneficial to introduced grasses and legumes. Controlling brush and weeds is necessary on pasture, but this generally is accomplished by mowing the hay meadows.

Bengal and Pirum soils have medium potential for native grass and Clebit soils have low potential. Controlling brush, proper grazing, and preventing wildfires help maintain or improve the quality and quantity of native grass.

Bengal soils have low potential for loblolly pine and shortleaf pine. Pirum soils have medium potential for loblolly pine and shortleaf pine. Because of shallow depth, Clebit soils have low potential for woodland. Concerns in management are controlling growth of hardwood trees to allow establishment and growth of pine, controlling grazing, proper stocking, and preventing wildfires.

Bengal and Clebit soils have low potential for most urban uses. Pirum soils have medium potential for dwellings without basements and for local roads and streets. The potential is low for other urban uses. Because of soil depth, slope, and permeability, these soils have low potential for use as septic tank absorption fields, sewage lagoons, and trench type sanitary landfills.

These soils have medium potential for use as camp areas and picnic areas and low potential for playgrounds.

These soils have high potential for use as habitat for bobwhite quail, squirrel, mourning dove, cottontail rabbit, and white-tailed deer.

These Bengal, Pirum, and Clebit soils are in capability subclass VIe. Bengal soil is in woodland suitability group 5o1, Pirum soil is in woodland suitability group 4o1, and Clebit soil is in woodland suitability group 5d2. Bengal and Pirum soils are in Sandy Savannah range site; Clebit soil is in Shallow Savannah range site.

6—Carnasaw stony loam, 4 to 15 percent slopes. This deep, well drained, gently sloping to moderately steep soil is on uplands primarily in the southern half of the county. Slopes are smooth and convex. Areas are 40 to 1,500 acres.

Typically, the surface layer is brown stony loam about 3 inches thick, and the subsurface layer is brown gravelly loam about 5 inches thick. The subsoil extends to about 51 inches. The upper part of the subsoil is yellowish red clay loam, the middle part is red clay, and the lower part is mottled, light gray, yellowish red, and red shaly clay. The underlying material is gray and yellowish brown soft shale.

This soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is slow, and the available water capacity is medium.

Included in mapping are small areas of the moderately deep Bengal soils, the deep, loamy Octavia soils, and the loamy Pirum soils, which are 20 to 40 inches deep over sandstone bedrock. The included soils make up about 10 to 25 percent of the map unit. Individual areas generally are less than 1 acre.

Most of this soil is used as woodland or grazable woodland. Because of slope and surface stoniness, this soil has low potential for cultivated crops, tame pasture, or native grass.

Carnasaw soils have medium potential for shortleaf pine and loblolly pine. Surface stoniness hinders but does not prevent woodland harvesting and planting. Concerns in management are controlling growth of hardwood trees to help establishment and growth of pine, controlling grazing, proper stocking, and preventing fires. Erosion is a low hazard. Revegetating unused logging roads helps control erosion.

This soil has low potential for most urban uses and medium potential for most recreational uses. The limitations are surface stoniness, slope, and the high shrink-swell potential.

This soil has high potential for use as habitat for white-tailed deer, squirrel, and turkey.

This soil is in capability subclass VIIs and in woodland suitability group 4x2; it is not assigned to a range site.

7—Carnasaw stony loam, 15 to 35 percent slopes. This deep, well drained, stony, moderately steep to steep soil is on uplands in the southern half of the county. Slopes are smooth and convex. Areas are 40 to 1,500 acres.

Typically, the surface layer is brown stony loam about 3 inches thick, and the subsurface layer is strong brown gravelly loam about 3 inches thick. The upper part of the subsoil is strong brown clay loam to about 11 inches, the middle part is yellowish red and red clay to about 39 inches, and the lower part is mottled, light gray, strong brown, and red shaly clay to about 50 inches. The underlying material is gray and yellowish brown soft shale.

This soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is slow, and the available water capacity is medium.

Included in mapping are small areas of the moderately deep Bengal soils, the deep, loamy Octavia soils, and the loamy Pirum soils, which are 20 to 40 inches deep over sandstone bedrock. The included soils make up about 10 to 25 percent of the map unit. Individual areas generally are less than 1 acre.

Most of the acreage of this soil is used as woodland or grazable woodland. Because of slope and surface stoniness, this soil has low potential for native grass, cultivated crops, or tame pasture.

Carnasaw soils have medium potential for shortleaf pine and loblolly pine. Surface stoniness and the steep slope hinder but do not prevent woodland harvesting and planting. Concerns in management are controlling hardwoods to help establishment and growth of pine, controlling grazing, proper stocking, and preventing wild fires. The hazard of erosion is medium. Revegetating unused logging roads helps control erosion.

This soil has low potential for most urban and recreational uses. The limitations are slope, surface stoniness, and the high shrink-swell potential.

This soil has high potential as habitat for white-tailed deer, squirrel, and turkey.

This soil is in capability subclass VIIs and in woodland suitability group 4x2; it is not assigned to a range site.

8—Carnasaw-Clebit complex, 4 to 15 percent slopes. This map unit consists of small areas of Carnasaw and Clebit soils that are so intermingled that they could not be separated at the scale selected for mapping. They are well drained, deep and shallow soils on ridge crests in the northern half of the county. Areas are 5 to 500 acres. Individual areas of each soil are from 2 acres to 15 acres.

The deep Carnasaw soil makes up about 75 percent of the map unit. Typically, the surface layer is brown stony loam about 3 inches thick, and the subsurface layer is yellowish brown gravelly loam to about 7 inches. The subsoil extends to about 43 inches. The upper part of the subsoil is strong brown clay loam, the middle part is red clay, and the lower part of the subsoil is mottled, light gray and yellowish red shaly clay. The underlying material is gray soft shale.

Carnasaw soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is slow, and the available water capacity is medium.

The shallow Clebit soil makes up about 15 percent of the map unit. Typically, the surface layer is dark brown stony fine sandy loam about 5 inches thick. The subsoil is strong brown gravelly fine sandy loam to about 14 inches. The underlying material is hard sandstone.

Clebit soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is moderately rapid, and the available water capacity is low.

Included in mapping are small areas of Bengal soils and small areas of soils similar to Carnasaw soils except that they have a layer of sandstone within the solum or are underlain by sandstone bedrock. Also included are small areas of Pirum soils. These included soils make up about 10 percent of the map unit. Individual areas generally are less than 2 acres.

These soils are used mainly as woodland or grazable woodland. Potential is low for shortleaf pine and loblolly pine.

Because sandstone cobbles and stones on the surface interfere with seedbed preparation, these soils have low potential for cultivated crops and tame pasture. Concerns in management are controlling growth of hardwood trees to help the establishment and growth of

pine, controlling grazing, proper stocking, and preventing fires.

The Carnasaw soil has medium potential for native grass, and the Clebit soil has low potential. Controlling brush, proper grazing, and preventing fires help maintain or improve the quality and quantity of native grass.

These soils have low potential for most urban uses because of soil depth, permeability, the high shrink-swell potential, and surface stoniness. The potential is low for playgrounds and is medium for camp areas and picnic areas.

These soils have high potential as habitat for white-tailed deer, squirrel, and turkey.

These Carnasaw and Clebit soils are in capability subclass VIIs and in woodland suitability group 5x2. Carnasaw soil is in Sandy Savannah range site, and Clebit soil is in Shallow Savannah range site.

9—Carnasaw-Octavia complex, 15 to 35 percent slopes. This map unit consists of small areas of Carnasaw and Octavia soils that are so intermingled that they could not be separated at the scale selected for mapping. They are deep, well drained, stony, moderately steep to steep soils on side slopes of mountains in the northern half of the county. Sandstones cover 3 to 40 percent of the surface. Areas are 20 to 800 acres. Individual areas of each soil are 1/10 acre to 3 acres.

Carnasaw stony loam makes up about 60 percent of the map unit. Typically, the surface layer is dark brown stony loam about 3 inches thick. The subsurface layer is yellowish brown stony loam about 3 inches thick. The subsoil extends to about 45 inches. The upper part is yellowish red clay, the middle part is red clay, and the lower part is mottled, light brownish gray, yellowish brown, and pale brown silty clay and shaly silty clay. The underlying material is gray and yellowish brown soft shale.

Carnasaw soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is slow, and the available water capacity is medium.

Octavia stony loam makes up about 25 percent of the map unit. Typically, the surface layer is very dark grayish brown stony loam about 5 inches thick. The subsurface layer is brown stony loam about 3 inches thick. The subsoil extends to a depth of about 61 inches. The upper part of the subsoil is reddish yellow gravelly loam; the middle part is strong brown grading to yellowish red gravelly clay loam; and the lower part is coarsely mottled, red, reddish yellow, yellowish red, light brownish gray, and light gray silty clay grading to shaly clay.

Octavia soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is moderately slow, and the available water capacity is medium. The root zone is deep, and except where fragments of sandstone are located, it is easily penetrated by plant roots.

Included in mapping are small areas of the moderately deep Bengal and Pirum soils on side slopes and small areas of the shallow Clebit soils near ridge crests. The included soils make up about 15 percent of the map unit. Individual areas generally are less than 3 acres.

These soils are used mainly as woodland or grazable woodland. The potential is low for loblolly pine and shortleaf pine. Concerns in management are controlling hardwoods to help the establishment and growth of pine, preventing fires, and controlling erosion in cutover areas. Revegetating unused logging roads helps control erosion.

These soils have low potential for cultivated crops, pasture, and most urban and recreational uses. The main limitations are surface stoniness and steep slope.

These soils have medium potential for native grass. Controlling brush, proper stocking, and preventing wildfires help maintain or improve the quality and quantity of native grass.

The soils have high potential as habitat for white-tailed deer, squirrel, and turkey.

These Carnasaw and Octavia soils are in capability subclass VIIs, in woodland suitability group 5x3, and in Sandy Savannah range site.

10—Carnasaw-Octavia complex, 35 to 50 percent slopes. This map unit consists of small areas of Carnasaw and Octavia soils that are so intermingled that they could not be separated at the scale selected for mapping. The soils are deep, well drained, and steep. They are on mid and lower slopes in areas that commonly are 1/4 to 3/4 mile in width and up to 5 miles in length. Benched areas on the slopes commonly are 100 to 300 feet wide and are randomly scattered throughout the map unit. Colluvial soils are on these benches as well as in some cove positions. The residual soils are on the slopes between benches and on side slopes, which are less susceptible to colluvial deposition. Areas are 40 to 1,000 acres. Individual areas of each soil are 1/4 acre to 3 acres.

Carnasaw stony loam makes up about 50 percent of the map unit. Typically, the surface layer is dark grayish brown stony loam about 2 inches thick, and the subsurface layer is yellowish brown stony loam about 3 inches thick. The subsoil extends to a depth of about 50 inches. The upper part is yellowish red clay that grades to red silty clay; the lower part is mottled, yellowish red, dark brown, and light gray shaly silty clay and silty clay. The underlying material is soft, partly weathered shale that has thin interbedded layers of hard sandstone.

The Carnasaw soil is low in natural fertility and organic matter content. It is acid thoughout. Permeability is slow, and the available water capacity is medium.

Octavia stony fine sandy loam makes up about 30 percent of the map unit. Typically, the surface layer is dark grayish brown stony fine sandy loam about 4 inches thick, and the subsurface layer is brown stony fine sandy

loam about 6 inches thick. The subsoil extends to a depth of about 72 inches. The upper part is strong brown gravelly loam, the middle part is yellowish red gravelly clay loam, and the lower part of the subsoil is red shaly clay.

Octavia soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is moderately slow, and the available water capacity is medium.

Included in mapping are small areas of Caston soils that are on benches and in cove areas. Also included are small areas of Clebit soils on geologically residual noses. These included soils make up about 20 percent of the map unit. Individual areas generally are less than 1 acre.

These soils have low potential for cultivated crops, pasture, native grass, and most urban and recreational uses. Steep slope and large surface stones are limitations that are very difficult to overcome.

These soils are used for woodland. Potential is medium for shortleaf pine, loblolly pine, red oak, white oak, and hickory. The steep slopes are an erosion hazard and restrict the use of logging equipment.

These soils have high potential as habitat for white-tailed deer, turkey, and squirrel.

These Carnasaw and Octavia soils are in capability subclass VIIs and woodland suitability group 4r9; they are not assigned to a range site.

11—Carnasaw-Pirum complex, 4 to 15 percent slopes. This map unit consists of small areas of Carnasaw and Pirum soils that are so intermingled that they could not be separated at the scale selected for mapping. They are well drained, deep and moderately deep, gently sloping to moderately steep soils. These soils are on uplands in the southern part of the county. The tilt of the beds, which is quite variable from ridge to ridge, determines the position of each of these soils in the landscape. Areas are 40 to 1,000 acres. Individual areas of each soils are 1/4 acre to 5 acres.

Carnasaw stony loam makes up about 65 percent of the map unit. Typically, the surface layer is brown stony loam about 4 inches thick, and the subsurface layer is brown gravelly loam about 3 inches thick. The subsoil extends to about 48 inches. The upper part is yellowish red clay loam, the middle part is red clay, and the lower part is mottled light gray, yellowish red, and red shaly clay. The underlying material is gray and olive soft shale.

Carnasaw soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is slow, and the available water capacity is medium.

Pirum stony fine sandy loam makes up about 25 percent of the map unit. Typically, the surface layer is brown stony fine sandy loam about 5 inches thick. The subsoil extends to a depth of about 28 inches. The upper part is reddish yellow gravelly fine sandy loam, and the lower part is yellowish red sandy clay loam. The underlying material is hard sandstone.

Pirum soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is moderate, and the available water capacity is low.

Included in mapping are small areas of Octavia and Caston soils on benches and in cove areas. Included soils make up about 10 percent of the map unit. Individual areas generally are less than 1 acre.

These soils are used mainly for woodland; many areas are used as grazable woodland. Because of slope and surface stoniness, these soils have low potential for cultivated crops, native grass, and tame pasture.

These soils have medium potential for shortleaf pine and loblolly pine. Surface stoniness hinders but does not prevent woodland harvesting and planting. Concerns in management are controlling hardwoods to help the establishment and growth of pine, controlling grazing, proper stocking, and preventing fires. The hazard of erosion is low. Revegetating unused logging roads helps control erosion.

These soils have low potential for most urban uses and medium potential for most recreational uses. Surface stoniness, slope, the shrink-swell potential, and depth to rock are the main limitations.

These soils have high potential as habitat for white-tailed deer, squirrel, and turkey.

These Carnasaw and Pirum soils are in capability subclass VIIs and woodland suitability group 4x2; they are not assigned to a range site.

12—Carnasaw-Pirum complex, 15 to 35 percent slopes. This map unit consists of small areas of Carnasaw and Pirum soils so intermingled that they could not be separated at the scale selected for mapping. They are well drained, deep and moderately deep, moderately steep to steep soils. These soils are in middle and lower positions on ridges in the southern part of the county. The tilt of the shale and sandstone beds, which is quite variable from ridge to ridge, determines the position of each of these soils. Areas are 40 to 1,000 acres. Individual areas of each soil are 1/4 acre to 5 acres.

Carnasaw stony loam makes up about 60 percent of the map unit. Typically, the surface layer is brown stony loam about 3 inches thick, and the subsurface layer is yellowish brown gravelly loam about 2 inches thick. The subsoil extends to a depth of about 52 inches. The upper part is yellowish red clay loam, the middle part is red clay, and the lower part is mottled, light gray, yellowish red, and red shaly clay. The underlying material is gray and yellowish brown soft shale.

Carnasaw soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is slow, and the available water capacity is medium.

Pirum stony fine sandy loam makes up about 25 percent of the map unit. Typically, the surface layer is brown stony fine sandy loam about 4 inches thick. The subsurface layer is brown gravelly fine sandy loam to

about 7 inches. The subsoil extends to a depth of 27 inches. The upper part is strong brown fine sandy loam, the middle part is strong brown sandy clay loam, and the lower part is yellowish red sandy clay loam. The underlying material is yellowish red hard sandstone.

Pirum soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is moderate, and the available water capacity is low.

Included in mapping are small areas of Octavia and Caston soils on benches and in coves. The included soils make up about 15 percent of the map unit. Individual areas generally are less than 1 acre.

These soils are used mainly as woodland, and many areas of woodland have sufficient forage for grazing. Because of steep slopes and surface stoniness, these soils have low potential for cultivated crops, native grass, and tame pasture.

These soils have medium potential for shortleaf pine and loblolly pine. Surface stoniness and steep slopes hinder but do not prevent tree planting and harvesting. Concerns in management are controlling growth of hardwood trees to help the establishment and growth of pine, controlling grazing, proper stocking, and preventing wildfires. The hazard of erosion is medium. Revegetating unused logging roads helps control erosion.

These soils have low potential for most urban and recreational uses. Steep slopes, surface stoniness, the high shrink-swell potential, and depth to bedrock are the main limitations.

These soils have high potential as habitat for white-tailed deer, squirrel, and turkey.

These Carnasaw and Pirum soils are in capability subclass VIIs and in woodland suitability group 4x3; they are not assigned to a range site.

13—Ceda-Rubble land complex, frequently flooded. This map unit consists of small areas of Ceda stony soil and Rubble land so intermingled that they could not be separated at the scale selected for mapping. Slopes are mainly 0 to 1 percent but range from 0 to 2 percent. The Ceda soil is deep, well drained, and stony. The areas of this map unit are on flood plains close to the mountainous areas, which are the source of the sediment in which the Ceda soil developed (fig. 2). The areas are subject to frequent flooding. They range in size from 40 to 400 acres. Individual areas of the Ceda soil and of Rubble land range from 1/10 acre to 2 acres in size.

Ceda stony soil makes up about 75 percent of the map unit. Typically, the surface layer is dark grayish brown stony fine sandy loam about 9 inches thick. The underlying material is strong brown and brown cobbly fine sandy loam to about 65 inches.

Ceda soil is medium in natural fertility and low in organic matter content. It is slightly acid or medium acid throughout. Permeability is rapid, and the available water capacity is low.

Rubble land makes up about 15 percent of the map unit. Rubble land consists of small areas of mixed gravel, cobbles, and stones.

Included in mapping are small areas that are not stony and small areas of Kenn soils. The included areas make up about 10 percent of this map unit. Individual areas generally are less than 1 acre in size.

Most areas of this map unit are used as woodland. Because of droughtiness, stoniness, and flooding, the potential for cultivated crops, native grasses, and urban uses is low. Stoniness prevents seedbed preparation and thus limits pasture improvement.

The Ceda soil has medium potential for shortleaf pine, loblolly pine, southern red oak, white oak, and sweetgum. The use of logging equipment is restricted by large stones. Because of droughtiness, seedling mortality is moderate. Frequent flooding restricts woodland operations for short periods.

Because of flooding the potential for most recreational uses and for urban uses is low.

The potential for habitat for turkey, squirrel, raccoon, beaver, and white-tailed deer is medium. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

This complex is in capability subclass VIIs. Ceda soil is in woodland suitability group 3x9; Rubble land is not assigned to a woodland group. This complex is not assigned to a range site.

14—Clebit stony fine sandy loam, 10 to 30 percent slopes. This shallow, stony, moderately steep to steep, well drained soil is on ridgetops and side slopes in the northern half of the county. Individual areas are 20 to 700 acres.

Typically, the surface layer is dark brown stony fine sandy loam about 4 inches thick. The subsoil is brown cobbly fine sandy loam to about 15 inches. The underlying material is hard sandstone.

This soil is low in natural fertility and organic matter content. It is slightly acid to strongly acid in the surface layer and slightly acid to very strongly acid in the subsoil. Permeability is moderately rapid, and the available water capacity is low. The shallow depth and fragments of sandstone in the soil limit the water-holding capacity of this soil and cause rapid runoff.

Included in mapping are a few intermingled areas of Bengal and Pirum soils. Also included are small areas of soils that are similar to Pirum soils except that they are only 10 to 20 inches thick. The included soils make up about 20 percent of this map unit. Individual areas generally are less than 5 acres.

Because of depth to bedrock and surface stoniness, this soil has low potential for most agricultural, urban, and recreational uses and as habitat for wildlife. Even though productivity is low, the best uses of this soil are for native range or woodland. Eastern redcedar and shortleaf pine are the best adapted trees.

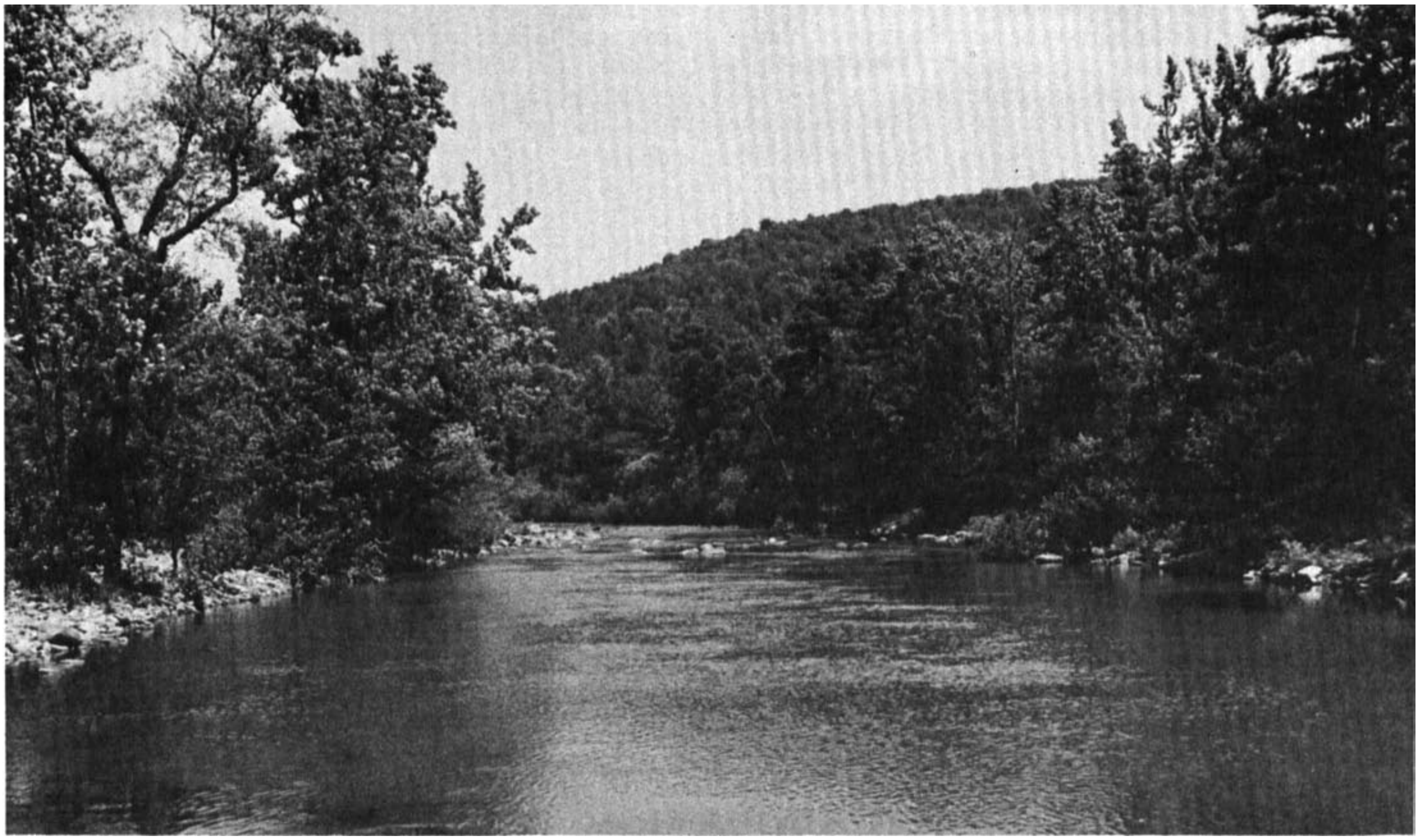


Figure 2.—A fishing stream in an area of Ceda-Rubble land complex, frequently flooded. Carnasaw soils are on the mountainside in the background.

This soil has low potential for native grass. Controlling brush, proper grazing, and preventing fires help maintain or improve the quality and quantity of native grass. Concerns in management include controlling growth of hardwood trees to help the establishment and natural growth of pine and native grasses, controlling grazing, proper stocking, and preventing wildfires.

This Clebit soil is in capability subclass VIIs, in woodland suitability group 5x0, and in the Shallow Savannah range site.

15—Clebit stony fine sandy loam, 30 to 60 percent slopes. This shallow, stony, well drained, steep to very steep soil is on side slopes of mountainous areas in the northern half of the county. Individual areas are 40 to 500 acres.

Typically, the surface layer is dark grayish brown stony fine sandy loam about 5 inches thick. The subsoil is brown cobbly fine sandy loam to about 14 inches. The underlying material is hard sandstone.

This soil is low in natural fertility and organic matter content. It is slightly acid to strongly acid in the surface layer and slightly acid to very strongly acid in the subsoil. Permeability is moderately rapid, and the available water capacity is low. The shallow depth and fragments of sandstone in the soil limit the water-holding capacity of this soil.

Included in mapping are intermingled areas of soils that have a brown stony loam surface layer, a yellowish brown gravelly or shaly loam or clay loam subsoil, and underlying shale at a depth of 8 to 20 inches. Also included are areas of rock outcrop.

The included soils make up about 35 to 45 percent of the map unit. Individual areas generally are less than 3 acres.

Most of the acreage of this soil is used as rangeland; however, some areas are so steep and stony that they are practically inaccessible to livestock.

Because of the shallowness, stoniness, and steep slopes, this soil has low potential for most agricultural, urban, and recreational uses and as habitat for wildlife. Even though productivity is low, the best use of this soil is native range or woodland. Eastern redcedar and shortleaf pine are the best adapted trees.

Potential for native grass is low. Controlling brush, proper grazing, and preventing wildfires help maintain or improve the quantity and quality of native grass. Concerns in management include controlling growth of hardwood trees to help in the establishment and natural growth of pine and native grasses, controlling grazing, proper stocking, and preventing fires.

The Clebit soil is in capability subclass VIIs, in woodland suitability group 5r0, and in the Savannah Breaks range site.

16—Clebit-Carnasaw-Pirum complex, cool, 4 to 35 percent slopes. This map unit consists of small areas of Clebit, Carnasaw, and Pirum soils that are so intermingled that they could not be separated at the scale selected for mapping. They are well drained, shallow to deep, stony, gently sloping to steep soils on mountaintops at higher elevations. Areas of these soils range from 700 to 1,200 feet in width and to as much as 5 miles in length. Individual areas of each soil are 1/4 acre to 3 acres.

Clebit stony fine sandy loam makes up about 40 percent of the map unit. Typically, the surface layer is very dark grayish brown stony fine sandy loam about 6 inches thick. The subsoil is brown cobbly fine sandy loam to about 15 inches. The underlying material is hard sandstone.

Clebit soil is low in natural fertility and organic matter content. It is slightly to medium acid throughout. Permeability is moderately rapid, and the available water capacity is low.

Carnasaw stony loam makes up about 30 percent of the map unit. Typically, the surface layer is brown stony loam about 3 inches thick, and the subsurface layer is yellowish brown cobbly loam about 3 inches thick. The subsoil extends to a depth of about 42 inches. The upper part is yellowish red clay loam, the middle part is yellowish red silty clay to about 24 inches, and the lower part is mottled, red, brownish yellow, and light gray silty clay that grades to shaly silty clay. The underlying material is olive and gray soft shale.

Carnasaw soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is slow, and the available water capacity is medium.

Pirum stony fine sandy loam makes up about 20 percent of the map unit. Typically, the surface layer is brown stony fine sandy loam about 6 inches thick. The subsurface layer is yellowish brown gravelly fine sandy loam to about 10 inches. The subsoil is yellowish red gravelly sandy clay loam to about 26 inches. The underlying material is hard sandstone bedrock.

Pirum soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is moderate, and the available water capacity is low.

Included in mapping are small areas of soils that have more than 35 percent coarse fragments in the subsoil and have sandstone bedrock at a depth of 20 to 40 inches. Also included are soils that are clayey and have more than 35 percent coarse fragments in the subsoil. The included soils make up about 10 percent of the map unit. Individual areas generally are less than 1 acre.

These soils have low potential for cultivated crops and tame pastures and for most recreational and urban uses. Large surface stones, shallow depth, and steep slopes are the main limitations and are difficult to overcome.

The Clebit soil has low potential for native grass. Carnasaw and Pirum soils have medium potential. Controlling brush, proper grazing, and preventing wildfires help maintain or improve the quantity and quality of native grass.

These soils have low potential for woodland. The most common tree on these soils is the northern red oak. Depth to bedrock, droughtiness, and ice and wind damage all contribute to cause scrubby tree growth.

These soils have medium potential as habitat for white-tailed deer, squirrel, and turkey.

These Clebit, Carnasaw, and Pirum soils are in capability subclass VIIs and in woodland suitability group 5x0. Clebit soil is in Shallow Savannah range site, and Carnasaw and Pirum soils are in Sandy Savannah range site.

17—Coushatta silt loam, rarely flooded, 0 to 1 percent slopes. This deep, well drained, nearly level to very gently undulating soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Areas are 10 to 400 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. Below that, it is dark brown silt loam to a depth of about 15 inches. The subsoil extends to a depth of 45 inches. The upper part is brown silt loam, and the lower part is reddish brown silty clay loam. The underlying material is brown very fine sandy loam to about 62 inches.

This soil is high in natural fertility and organic matter content. It is slightly acid or neutral in the surface layer but ranges from neutral to moderately alkaline in the subsoil. Permeability is moderate, and the available water capacity is high. The soil has good tilth and can be tilled within a wide range of moisture content.

Included in mapping are a few intermingled areas of Roxana and Oklared soils and a few small wet areas that are the result of blocked drainage. The included soils make up about 15 percent of the map unit. Individual areas generally are less than 5 acres.

This soil has high potential for row crops and small grains, and this is its main use. Returning crop residue to the soil helps maintain good tilth. Erosion is a slight hazard. Lime seldom is needed, but crops normally respond to fertilizer.

Potential is high for hay and pasture. This soil also has high potential for eastern cottonwood, pecan, and black walnut. There are no significant limitations to use and management of pasture, hay, or woodland. If this soil is

used for commercial production of trees, grazing by livestock is not recommended.

Because of rare flooding this soil has low potential for most urban uses and for camp areas. Potential is high for picnic areas, playgrounds, and as habitat for wildlife. The number of wildlife present is dependent upon the amount of food and cover present. In tilled areas food and cover are limited.

This Coushatta soil is in capability class I and in woodland suitability group 2o4; it is not assigned to a range site.

18—Coushatta silt loam, rarely flooded, undulating. This deep, well drained, gently undulating soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes are short and irregular and dominantly are 1 to 3 percent. Areas are 10 to 200 acres.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil extends to a depth of about 35 inches. The upper part is dark reddish brown silt loam, and the lower part is dark reddish brown silty clay loam. The underlying material is reddish brown fine sandy loam and reddish yellow loamy fine sand to about 63 inches.

This soil is high in natural fertility and organic matter content. It is slightly acid or neutral in the surface layer but ranges from neutral to moderately alkaline in the subsoil. Permeability is moderate, and available water capacity is high. This soil has good tilth and can be tilled within a wide range of moisture content. Concave areas remain wet for slightly longer periods following rainfall.

Included in mapping are a few intermingled areas of Roxana and Oklared soils. The included soils make up about 10 to 15 percent of the map unit. Individual areas generally are less than 5 acres.

This soil has high potential for and is used mainly for row crops and small grains. Row crops can be grown in a cropping system with other crops that produce enougn residue to help control water erosion and maintain tilth. Irregular slopes make terracing impractical. The hazard of flooding is slight. Lime seldom is needed; crops normally respond to fertilizer.

The potential is high for hay and pasture. This soil also has high potential for eastern cottonwood, pecan, and black walnut. There are no significant limitations to use and management of pasture, hay, or woodland. If this soil is used for commercial production of trees, grazing by livestock is not recommended.

Because of rare flooding, this soil has low potential for most urban uses or use as camp areas. Potential is high for picnic areas or as habitat for wildlife, and potential is medium for playgrounds. The number of wildlife present is dependent upon the amount of food and cover present. In tilled areas, food and cover are limited.

This Coushatta soil is in capability subclass IIe and in woodland suitability group 2o4; it is not assigned to a range site.

19—Coushatta silty clay loam, rarely flooded, undulating. This deep, well drained, gently undulating soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes are short and irregular and dominantly are 1 to 3 percent. Areas are 20 to 140 acres.

Typically, the surface layer is reddish brown silty clay loam about 9 inches thick. The subsoil is reddish brown silty clay loam to about 38 inches. The underlying material is reddish brown silt loam and very fine sandy loam to about 61 inches.

This soil is high in natural fertility and organic matter content. It is slightly acid or neutral in the surface layer but ranges from neutral to moderately alkaline in the subsoil and underlying material. Permeability is moderate, and the available water capacity is high. Because of the silty clay loam surface layer, this soil can be tilled only within a narrow range of moisture content. Concave areas remain wet for slightly longer periods following rainfall.

Included in mapping are a few intermingled areas of Coushatta silt loam and Roxana and Oklared soils. The included soils make up about 10 to 15 percent of the map unit. Individual areas generally are less than 1 acre.

Most of the acreage is used for cultivated crops. This soil has high potential for row crops and small grains. Row crops can be grown in a cropping system with other crops that produce enough residue to help control water erosion and maintain tilth. Irregular slopes make terracing impractical. The hazard of flooding is slight. Lime seldom is needed, but crops normally respond to fertilizer.

The potential is high for hay and pasture. This soil also has high potential for eastern cottonwood, pecan, and black walnut. There are no significant limitations to use and management of pasture, hay, or woodland. If the soil is used for commercial production of trees, grazing by livestock is not recommended.

Because of rare flooding, this soil has low potential for most urban uses or for use as camp areas. Potential is high for picnic areas or as habitat for wildlife, and potential is medium for playgrounds. The number of wildlife present is dependent upon the amount of food and cover present. In tilled areas, food and cover are limited.

This Coushatta soil is in capability subclass IIe and in woodland suitability group 2o4; it is not assigned to a range site.

20—Coushatta loamy fine sand, overwash, rarely flooded. This deep, well drained, nearly level to gently undulating soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes are mainly 0 to 1 percent, but the range is 0 to 2 percent. Areas are 20 to 200 acres.

Typically, the surface layer is brown loamy fine sand about 16 inches thick. The subsoil extends to a depth of

36 inches. The upper part is reddish brown silt loam, and the lower part is dark reddish brown silty clay loam. The underlying material is reddish brown very fine sandy loam over light reddish brown loamy fine sand to about 70 inches.

This soil is medium in natural fertility and low in organic matter content. It is slightly acid or neutral in the surface layer but ranges from neutral to moderately alkaline in the subsoil and underlying material. Permeability is moderate, and the available water capacity is low in the sandy surface layer and high in the subsoil.

Included in mapping are a few intermingled areas of Crevasse and Kiomatia soils. The included soils make up about 10 percent of the map unit. Individual areas generally are 5 acres or less.

Most of the acreage is used for cultivated crops. This soil has medium potential for row crops and small grains. Row crops can be grown in a cropping system with other crops that produce enough residue to help control water and wind erosion. Returning crop residue to the soil helps maintain tilth and conserve moisture. The hazard of flooding is slight. Lime seldom is needed, but crops normally respond to fertilizer.

The potential is high for hay and pasture plants, especially deep-rooted plants. This soil also has high potential for eastern cottonwood, black walnut, pecan, and American sycamore. The sandy surface layer increases seedling mortality and restricts equipment use. If this soil is used for commercial production of trees, grazing by livestock is not recommended.

Because of rare flooding, this soil has low potential for most urban uses and for use as camp areas. Potential is high for picnic areas, playgrounds, or as habitat for wildlife. The number of wildlife present is dependent upon the amount of food and cover present. In tilled areas, food and cover are limited.

This Coushatta soil is in capability subclass IIIs and in woodland suitability group 2s5; it is not assigned to a range site.

21—Cowton loam, 2 to 5 percent slopes. This moderately deep, well drained, very gently sloping to gently sloping soil is on low ridges in the northern half of the county. Slopes are smooth and convex. Areas are 10 to 200 acres.

Typically, the surface layer is very dark grayish brown loam about 7 inches thick. Below that to a depth of about 11 inches, it grades to dark brown gravelly loam. The subsoil extends to a depth of about 31 inches. The upper part is yellowish red clay loam, the middle part is yellowish red clay, and the lower part is mottled red, light brown, and light gray clay. The underlying material is red and gray soft shale.

This soil is medium in natural fertility and organic matter content. It is acid throughout except where the surface has been limed. Permeability is slow, and the available water capacity is medium.

Included in mapping are soils, on ridgetops, that are loam or fine sandy loam and are underlain by sandstone bedrock at a depth of 8 to 14 inches. Also included are intermingled areas of soils that have a loam surface layer and a clay loam subsoil that is underlain by sandstone bedrock at a depth of 20 to 40 inches. The included soils make up 15 to 25 percent of this map unit. Individual areas generally are less than 2 acres.

Most of this acreage is used for native grass meadow or tame pasture. Because of the hazard of erosion and inclusions of shallow soils, this soil has low potential for cultivated crops. If row crops are grown, terraces and contour tillage help reduce erosion. Returning crop residue to the soil helps increase water intake.

Potential is medium for native grasses, bermudagrass, and tall fescue. Introduced grasses and cultivated crops respond to fertilizer and lime. Controlling brush and weeds is necessary on pastures, but generally on hay meadows this is accomplished by mowing. Controlling brush, proper grazing, and preventing fires help maintain or improve the quantity and quality of all grasses.

This soil has low potential for woodland. The common trees are blackjack oak, post oak, and sassafras. They are in open stands.

Because of its moderate depth and predominantly clayey subsoil, this soil has low potential for most urban uses. It has medium potential for most recreational uses. This soil has high potential as habitat for bobwhite quail, mourning dove, and cottontail rabbit. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

This Cowton soil is in capability subclass IVe and Loamy Savannah range site; it is not assigned to a woodland suitability group.

22—Cowton loam, 5 to 15 percent slopes. This moderately deep, well drained, sloping to moderately steep soil is on low ridges in the northern half of the county. Slopes are smooth and convex. Areas are 10 to 150 acres.

Typically, the surface layer is very dark grayish brown loam about 8 inches thick. The subsoil extends to a depth of about 34 inches. The upper part is yellowish red clay loam, the middle part is dark red silty clay, and the lower part is mottled red, reddish yellow, and light gray silty clay. The underlying material is yellowish brown and gray soft shale.

This soil is medium in natural fertility and organic matter content. It is acid throughout except where the surface has been limed. Permeability is slow, and the available water capacity is medium.

Included in mapping are soils, on ridgetops, that are loam or fine sandy loam and are underlain by sandstone bedrock at a depth of 8 to 14 inches. Also included are intermingled areas of soils that have a loam surface

layer and a clay loam subsoil that is underlain by sandstone bedrock at a depth of 20 to 40 inches. The included soils make up about 15 to 25 percent of this map unit. Individual areas generally are less than 2 acres.

Most of the acreage is used for native grass meadow or tame pasture. Because of the hazard of erosion and slope, this soil has low potential for cultivated crops. The potential is low for native grasses, bermudagrass, and tall fescue. A vegetative cover at all times is essential in controlling erosion. Bermudagrass responds to fertilizer and lime. Controlling brush and weeds is necessary on pastures, but generally on hay meadows this is accomplished by mowing. Controlling brush, proper grazing, and preventing wildfires help maintain or improve the quantity and quality of native grass.

This soil has low potential for woodland. The common trees are blackjack oak, post oak, and sassafras. They are in open stands.

Because of its moderate depth and dominantly clayey subsoil, this soil has low potential for most urban uses. It has medium potential for most recreational uses and has high potential as habitat for bobwhite quail, mourning dove, and cottontail rabbit. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

This Cowton soil is in capability subclass VIe and Loamy Savannah range site; it is not assigned to a woodland suitability group.

23—Crevasse loamy fine sand, rarely flooded, undulating. This deep, excessively drained, undulating soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes are 1 to 3 percent and are gently undulating. Areas are 10 to 150 acres.

Typically, the surface layer is yellowish brown loamy fine sand about 12 inches thick. The underlying material is light yellowish brown loamy fine sand to about 56 inches and light yellowish brown medium sand to about 65 inches.

This soil is low in natural fertility and organic matter content. It ranges from slightly acid to moderately alkaline; in places, it is calcareous. Permeability is rapid, and the available water capacity is low. The root zone is deep and easily penetrated by plant roots.

Included in mapping are small, lower lying areas of Kiomatia soils, which have strata of finer textured material. Also included, in slightly higher lying positions, are small areas of Oklared soils. The included soils make up about 10 to 15 percent of this map unit. Areas generally are less than 1 acre.

Most of the acreage is used as woodland; some small areas are cleared and used for cultivated crops. This soil has low potential for cultivated crops, native grass, and tame pasture. The soil is limited because of droughtiness and because conventional wheeled equipment cannot be used during very dry periods. If this soil is used as pasture, cool-season legumes are better suited than warm-season legumes because moisture conditions generally are more favorable in winter and spring.

This soil has medium potential as woodland. Cottonwood is the most desirable species for planting. Black locust can be planted for post lots. Seedling mortality is high.

Because of rapid permeability, sandy texture, and rare flooding, this soil has low potential for most urban uses. Because of flooding the potential is low for use as camp areas. It is high for most other recreational uses. This soil has low potential as habitat for quail, mourning dove, and rabbit.

This Crevasse soil is in capability subclass IVs and in woodland suitability group 3s6; it is not assigned to a range site.

24—Cupco silt loam, occasionally flooded. This deep, somewhat poorly drained soil is on flood plains along local streams primarily in the northern two-thirds of the county. This soil is subject to occasional flooding. Slopes are less than 1 percent and are nearly level to slightly depressional. Areas are 30 to 200 acres.

Typically, the surface layer is dark grayish brown silt loam about 11 inches thick. The subsurface layer is light brownish gray silt loam about 10 inches thick. The upper part of the subsoil is grayish brown silty clay loam to about 55 inches, and the lower part is brown silty clay loam to about 83 inches. Mottles in shades of gray and brown are throughout the soil.

This soil is medium in natural fertility and organic matter content. It is acid in the surface layer and upper part of the subsoil and is acid or neutral in the lower part of the subsoil. Permeability is moderately slow, and the available water capacity is high. Excess water on and below the surface during winter and early in spring causes problems in management.

Included with this soil in mapping are soils, in swale areas, that are poorly drained and generally are more gray throughout the subsoil. Also included are intermingled areas of Neff silt loam. The included soils make up about 10 to 20 percent of the map unit. Individual areas generally are less than 3 acres.

Most of the acreage is used as pasture; some areas are used as woodland. This soil has medium potential for row crops and small grains, but the potential for native grasses is low. Occasional flooding and seasonal wetness are the main limitations. The potential is medium for tall fescue, bermudagrass, and white clover. The dominant concern in management is removing excess water. Field drainage ditches help remove excess surface water, but they do not completely eliminate the internal wetness. In some places a subsurface drainage system is needed. Flooding occasionally damages crops and fences. Returning crop residue to the soil helps maintain tilth. Pasture and cultivated crops respond to fertilizer and lime.

This soil has medium potential for willow oak, green ash, and water oak. The use of equipment is restricted during wet seasons. If this soil is used for commercial production of trees, grazing by livestock is not recommended.

Because of seasonal wetness and flooding, this soil has low potential for most urban and recreational uses. The potential of this soil as habitat for wildlife is high if adequate amounts of food and cover are maintained.

This Cupco soil is in capability subclass IIIw and in woodland suitability group 3w5; it is not assigned to a range site.

25—Garton silty clay loam, rarely flooded. This deep, moderately well drained, nearly level soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes are smooth and less than 1 percent. Areas are 25 to 500 acres.

Typically, the surface layer is very dark grayish brown silty clay loam about 6 inches thick. The upper part of the subsoil is very dark grayish brown and dark brown silty clay loam to about 33 inches, the middle part is reddish brown silty clay to about 51 inches, and the lower part is reddish brown clay loam to about 63 inches.

This soil is high in natural fertility and organic matter content. It is neutral or slightly acid in the surface layer and upper part of the subsoil. The middle part of the subsoil is slightly acid to moderately alkaline, and the lower part is neutral or mildly alkaline. Permeability is slow, and the available water capacity is high. For short periods, wetness limits accessibility and the use of machinery.

Included with this soil in mapping are small areas of Lela soils that are in slightly lower positions. Small areas of the slightly higher lying Redport soils are also included. The included soils make up abut 10 to 15 percent of the map unit. Individual areas generally are less than 1 acre.

Most of the acreage is used for cultivated crops. This soil has high potential for row crops and small grains. Crops respond favorably to fertilizer, but lime generally is not needed. Returning crop residue to the soil helps maintain tilth. The hazard of erosion is slight. Potential is high for hay and tame pasture but low for native grass.

This soil has high potential for eastern cottonwood and American sycamore. For short periods, wetness limits the use of machinery. If this soil is used for commercial production of trees, grazing by livestock is not recommended.

Because of rare flooding and the high shrink-swell potential, this soil has low potential for most urban uses and medium potential for most recreational uses.

This soil has high potential as habitat for wildlife. The number of wildlife present is dependent upon the available food and cover. Food and cover are limited in tilled areas.

This Garton soil is in capability class I and in woodland suitability group 2o4; it is not assigned to a range site.

26—Kamie loamy fine sand, 3 to 8 percent slopes. This deep, well drained, gently sloping and sloping soil is on high alluvial terraces near the Arkansas River flood plain. Slopes are smooth and convex. Areas are 25 to 450 acres.

Typically, the surface layer is dark brown loamy fine sand about 7 inches thick, and the subsurface layer is brown loamy fine sand to about 15 inches. The upper part of the subsoil is yellowish red sandy clay loam to about 41 inches, and the lower part is yellowish red fine sandy loam and sandy clay loam to about 64 inches.

This soil is medium in natural fertility and low in organic matter content. It is neutral through medium acid in the surface layer and is acid in the subsoil. Permeability is moderate, and the available water capacity is medium.

Included in mapping are small areas of Sallisaw soils and small areas of the very slowly permeable McKamie soils. The included soils make up about 15 to 25 percent of the map unit. Individual areas generally are less than 3 acres.

Most of the acreage is used for pasture. This soil has low potential for row crops and small grains. A cropping system that provides plant cover during winter and spring helps protect the soil from wind and water erosion. Stripcropping, minimum tillage, contour farming, returning crop residue to the soil, and fertilizer are needed to reduce erosion and maintain fertility. Cover crops are needed if low-residue crops are grown. Diversion terraces are needed in some places.

The potential is medium for bermudagrass and fescue. It is high for hop clover and arrowleaf clover. Control of brush and weeds is needed to maintain stands in tame pastures. On hayland, this is accomplished by mowing. Pasture plants respond to fertilizer and lime.

This soil has medium potential for shortleaf pine, loblolly pine, and southern red oak. There are no significant limitations to use and management of woodland.

This soil has medium potential for most urban uses. Low strength, slope, and seepage are limitations for some uses, but they can be overcome by proper design and careful installation.

The potential is high for most recreational uses.

This soil has high potential as habitat for bobwhite quail, mourning dove, cottontail rabbit, and white-tailed deer. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

This Kamie soil is in capability subclass IVe and in woodland suitability group 3o7; it is not assigned to a range site.

27—Kamie loamy fine sand, 3 to 8 percent slopes, eroded. This deep, well drained, gently sloping and

sloping soil is on high alluvial terraces near the Arkansas River flood plain. Slopes are smooth and convex. Areas are 15 to 500 acres.

Typically, the surface layer is brown loamy fine sand about 7 inches thick. The upper part of the subsoil is yellowish red sandy clay loam to about 50 inches, and the lower part is yellowish red fine sandy loam to about 75 inches.

Erosion has thinned the surface layer and created rills and a few gullies. Thickness of the surface layer varies considerably within short distances. In about half of a given area, the surface layer is 3 to 8 inches thick and generally has some subsurface or subsoil material. In the other half of the area, the surface layer is 8 to 20 inches thick. Small areas are not eroded. The surface layer is thinnest near rills and the infrequent gullies.

This soil is low in natural fertility and organic matter content. It is neutral through medium acid in the surface layer and is acid in the subsoil. Permeability is moderate, and the available water capacity is medium.

Included in mapping are small areas of Sallisaw soils and small areas of the very slowly permeable McKamie soils. The included soils make up about 15 to 25 percent of the map unit. Individual areas generally are less than 3 acres.

Most of the acreage is used for pasture. This soil has low potential for row crops and small grains. The hazard of further erosion is severe. The loss of part of the original surface layer by erosion has reduced the fertility, organic matter content, and productivity of the soil. A cropping system that provides a plant cover during winter and spring helps protect the soil from wind and water erosion. Cover crops are needed if low-residue crops are grown. Stripcropping, minimum tillage, contour farming, returning crop residue to the soil, and fertilizer are needed to help reduce erosion and maintain fertility. Diversion terraces are needed in some places.

The potential is medium for bermudagrass and fescue. It is high for hop clover and arrowleaf clover. Control of brush and weeds is necessary to maintain stands on tame pasture. On hayland, this is accomplished by mowing. Pasture plants respond to fertilizer and lime.

This soil has medium potential for shortleaf pine, loblolly pine and southern red oak. There are no significant limitations for woodland use and management.

This soil has medium potential for most urban uses. Low strength, slope, and seepage are limitations for some uses, but they can be overcome by proper design and careful installation.

The potential is high for most recreational uses.

This soil has high potential as habitat for bobwhite quail, mourning dove, cottontail rabbit, and white-tailed deer. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

This Kamie soil is in capability subclass IVe and woodland suitability group 3o7; it is not assigned to a range site.

28—Kanima shaly silty clay loam, 10 to 50 percent slopes. This map unit consists of a deep, well drained, strongly sloping to very steep, shaly soil and strip mine pits on uplands, primarily in the northern half of the county. This unit includes the spoil banks that remain after strip mining operations and the pits that were the source of the removed material. The Kanima soil formed in the spoil material weathered from shale that has small amounts of interbedded sandstone. Areas mostly are long and narrow, commonly are 200 to 1,100 feet wide, and range from 3 acres to 700 acres. The largest area is about 6 miles long.

This well drained Kanima soil makes up about 80 percent of the map unit. Typically, the surface layer is dark grayish brown shaly silty clay loam about 6 inches thick. The underlying material is dark grayish brown very shaly silty clay loam that extends to about 75 inches.

This Kanima soil has moderate permeability. It is medium in natural fertility and low in organic matter content. The available water capacity is low. Reaction ranges from medium acid to moderately alkaline throughout.

The pits, which make up about 20 percent of the map unit, commonly are 50 to 500 feet wide, 500 to 5,000 feet long, and 35 to 100 feet deep. They usually hold water that is within 5 to 25 feet of the adjoining ground level.

Habitat for wildlife, sanitary landfills, and woodlots are the main uses of the Kanima soil. Vegetation on older spoil banks is winged elm, sumac, black locust, and blackjack oak and a sparse understory of grasses and weeds. This soil has low potential for cultivated crops, tame pasture, unimproved pasture, commercial woodland, recreation, and urban uses.

The potential for pasture is low because the available water capacity is low and the steepness and variability of the slopes make it difficult to prepare a seedbed.

The soil has low potential as habitat for mourning dove, quail, and cottontail rabbit.

This Kanima soil is in capability subclass VIIs; it is not assigned to a woodland suitability group or a range site.

29—Kenn-Ceda complex, occasionally flooded. This map unit consists of small areas of Kenn and Ceda soils that are so intermingled that they could not be separated at the scale selected for mapping. They are deep, well drained soils on flood plains that are subject to occasional flooding. Slopes are mainly less than 1 percent but range from 0 to 2 percent. These soils are close to mountainous areas, which are the source of sediments in which the soils developed. The areas of this complex range in size from 10 to 200 acres. The

areas of the individual soils range from 1/10 acre to 3 acres.

Kenn loam makes up about 65 percent of the map unit. Typically, the surface layer is dark brown loam about 7 inches thick. The upper part of the subsoil is yellowish red clay loam, and the lower part is brown very gravelly clay loam to about 45 inches. The underlying material is dark yellowish brown cobbly loam to about 70 inches.

Kenn soil is medium in natural fertility and organic matter content. It is acid throughout except the surface layer where lime has been applied. Permeability is moderate, and the available water capacity is medium.

Ceda cobbly loam makes up about 30 percent of the map unit. Typically, the surface layer is brown cobbly loam about 8 inches thick. The underlying material is strong brown grading to brown cobbly clay loam to about 65 inches.

Ceda soil is medium in natural fertility and low in organic matter content. It is acid throughout except the surface layer where lime has been applied. Permeability is rapid, and the available water capacity is low.

Included in mapping are small areas of soils that have cobbles or stones on the surface. The included soils make up about 5 percent of the map unit. Individual areas generally are less than 1 acre.

Most of the acreage of this map unit is used for pasture or as woodland. Because of the droughtiness of the Ceda soil and occasional flooding, the potential for cultivated crops is low. The potential for tall fescue and bermudagrass is medium. Tame grasses respond to fertilizer and lime. Brush and weed control is essential on pastures.

The potential is medium for shortleaf pine, loblolly pine, and sweetgum. Because of droughtiness, seedling mortality is a moderate limitation on the Ceda soil. These soils are subject to occasional flooding that curtails all woodland operations for short periods.

Because of flooding, these soils have low potential for most urban uses. Their potential is low for use as camp areas and medium for use as playgrounds and picnic areas.

These soils have high potential as habitat for cottontail rabbit, squirrel, raccoon, beaver, and white-tailed deer. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

These Kenn and Ceda soils are in capability subclass IVw; they are not assigned to a range site. Kenn soil is in woodland suitability group 3o7; Ceda soil is in woodland suitability group 3f9.

30—Kiomatia fine sandy loam, rarely flooded. This deep, well drained, nearly level to gently undulating soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes are mainly less than 1 percent but range from 0 to 3 percent. Areas are 10 acres to 200 acres.

Typically, the surface layer is brown fine sandy loam about 9 inches thick. The underlying material to about 60 inches is light brown loamy fine sand that has strata of finer textured material.

This soil is medium in natural fertility and low in organic matter content. It ranges from slightly acid to moderately alkaline, and in some areas it is calcareous throughout. Permeability is rapid, and the available water capacity is low. The root zone is deep and easily penetrated by plant roots.

Included in mapping are small areas of Oklared soils and a few intermingled areas of Crevasse, Norwood, and Severn soils. The included soils make up about 10 to 15 percent of the map unit. Individual areas generally are less than 1 acre.

Most of the acreage of this soil is used for cultivated crops. Because of droughtiness, the soil has low potential for row crops and small grains. Row crops should be grown in a cropping system with other crops that produce an adequate amount of residue to help control water and wind erosion. Returning crop residue to the soil helps to maintain tilth and conserve moisture. The hazard of flooding is slight. Plants seldom need lime, but they respond to fertilizer.

The potential is medium for hay and pasture. There are no significant limitations for use and management.

This soil has high potential for eastern cottonwood, black walnut, and American sycamore, but droughtiness causes moderate seedling mortality. If this soil is used for commercial production of trees, grazing by livestock is not recommended.

Because this soil is rarely flooded, it has low potential for most urban uses and camp areas. The potential is high for use as picnic areas and playgrounds.

This soil has medium potential as habitat for quail, mourning dove, and rabbit. The number of wildlife present is dependent upon the amount of food and cover present. In tilled areas, food and cover are limited.

This Kiomatia soil is in capability subclass IIIs and in woodland suitability group 2s5; it is not assigned to a range site.

31—Kiomatia silty clay loam, rarely flooded. This deep, well drained, nearly level to gently undulating soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes range from 0 to 3 percent but mainly are less than 1 percent. Areas are 50 to 150 acres.

Typically, the surface layer is reddish brown silty clay loam about 11 inches thick. The underlying material to about 65 inches is brown loamy fine sand and has strata of finer textured material.

This soil is medium in natural fertility and in organic matter content. It ranges from slightly acid to moderately alkaline and in places is calcareous throughout. Permeability is rapid, but the intake rate of the surface

layer is moderate. Available water capacity is low. The root zone is deep and easily penetrated by plant roots.

Included in mapping are small areas of Oklared soils and a few intermingled areas of Norwood and Severn soils. The included soils make up about 10 to 15 percent of the map unit. Individual areas generally are less than 1 acre.

Most of the acreage of this soil is used for cultivated crops. It has low potential for row crops and small grains. Row crops should be grown in a cropping system with other crops that produce an adequate amount of residue to help control erosion. Returning crop residue to the soil helps maintain tilth and conserve moisture. The hazard of flooding is slight. Plants seldom need lime, but they respond to fertilizer.

The potential is medium for hay and pasture. There are no significant limitations for use and management.

This soil has high potential for eastern cottonwood, black walnut, and American sycamore, but droughtiness causes moderate seedling mortality. If this soil is used for commercial production of trees, grazing by livestock is not recommended.

Because it is rarely flooded, this soil has low potential for most urban uses. It has medium potential for use as picnic areas and playgrounds and low potential for use as camp areas.

This soil has medium potential as habitat for wildlife. The number of wildlife present is dependent upon the amount of food and cover. In tilled areas, food and cover are limited.

The Kiomatia soil is in capability subclass IIIs and woodland suitability group 2s5; it is not assigned to a range site.

32—Latanier silty clay, rarely flooded. This deep, somewhat poorly drained, nearly level to gently undulating soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes are mainly less than 1 percent. Areas are 10 to 300 acres.

Typically, the surface layer is dark reddish brown silty clay about 7 inches thick. The subsoil is dark reddish brown silty clay to about 31 inches. The underlying material to about 86 inches is brown silt loam and very fine sandy loam that has a thin layer of reddish brown clay in the lower part.

This soil is high in natural fertility and organic matter content. It is neutral to moderately alkaline in the surface layer and is moderately alkaline and calcareous in the subsoil. Permeability is very slow, and the available water capacity is high. The clayey texture and the narrow range of moisture content within which the soil can be worked are limitations to the use of equipment. Wetness causes difficulty in establishing uniform stands of crops. Surface drainage usually is needed.

Included in mapping are small areas of Moreland soils in the swales on undulating landscapes. Also included are small areas of Wabbaseka soils. The included soils make up about 10 to 15 percent of the map unit. Individual areas generally are less than 1 acre.

Most of the acreage is used for cultivated crops. This soil has high potential for row crops and small grains. Crops respond well to fertilizer; lime generally is not needed. Returning crop residue to the soil helps maintain tilth. The hazard of erosion is slight. The potential is high for hay and pasture.

This soil has high potential for eastern cottonwood and American sycamore. Excess surface water and restricted drainage limit woodland management. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Because of flooding and the high shrink-swell potential, this soil has low potential for most urban and recreational uses.

This soil has high potential as habitat for wildlife. The amount of wildlife present is dependent upon available food and cover. Food and cover are limited in tilled areas.

This soil is in capability subclass IIIw and woodland suitability group 2w5; it is not assigned to a range site.

33—Lela very fine sandy loam, overwash, rarely flooded. This deep, somewhat poorly drained, nearly level to very gently undulating soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Cultivated areas are less undulating than areas that have not been cultivated. Slopes are 0 to 1 percent. Areas are 15 to 250 acres.

Typically, the surface layer is dark brown very fine sandy loam about 10 inches thick. The layer below that is very dark brown silty clay to about 50 inches. The underlying material is very dark grayish brown silty clay to about 63 inches.

This soil is high in natural fertility and medium in organic matter content. It is moderately alkaline and calcareous in the surface layer and mildly alkaline or moderately alkaline in the subsoil. Permeability is very slow, and the available water capacity is high. This soil can be tilled within a wide range of moisture content. In wet years, wetness caused by the restricted movement of water into the clayey subsoil makes it difficult to establish a uniform stand of crop plants.

Included in mapping are small areas of Lela silty clay and soils similar to Lela soil except that they are silty clay loam in the upper part of the subsoil. The included soils make up about 5 to 10 percent of the map unit. Individual areas generally are less than 2 acres.

Most of the acreage is used for cultivated crops and woodland. This soil has high potential for row crops and small grains. Crops respond well to fertilizer, but lime generally is not needed. Returning crop residue to the soil helps maintain soil tilth. The hazard of erosion is slight. Surface drainage is needed in some areas. Potential is high for hay and pasture.

This soil has medium potential for eastern cottonwood, pecan, and green ash. The restricted internal drainage is a limitation in woodland management. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Because of rare flooding and the high shrink-swell potential, this soil has low potential for most urban and recreational uses.

This soil has high potential as habitat for wildlife. The amount of wildlife present is dependent upon available food and cover. Food and cover are limited in tilled areas.

This Lela soil is in capability subclass IIIw and in woodland suitability group 3w5; it is not assigned to a range site.

34—Lela silty clay, rarely flooded, 0 to 1 percent slopes. This deep, somewhat poorly drained, nearly level soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes are smooth in cultivated areas and have gilgai microrelief in undisturbed areas. Areas are 10 to 250 acres.

Typically, the surface layer is very dark grayish brown silty clay about 20 inches thick. The layer below that is very dark grayish brown silty clay to about 37 inches. The underlying material is dark brown grading to dark reddish brown silty clay to about 70 inches.

This soil is high in natural fertility and organic matter content. It is neutral to moderately alkaline in the surface layer and is moderately alkaline below that. In places, the underlying material is calcareous. Permeability is very slow, and the available water capacity is high. Deep cracks form in the soil as it dries. The clayey surface layer and excess surface water are management problems. The soil can be worked only within a narrow range of moisture content. Wetness causes difficulty in establishing uniform stands of crops. Surface drainage usually is needed.

Included in mapping and making up about 10 to 15 percent of this map unit are small areas of Garton soils. Individual areas of Garton soils generally are less than 1 acre.

Most of the acreage is used for cultivated crops. This soil has medium potential for row crops and small grains. Crops respond well to fertilizer, but lime generally is not needed. Returning crop residue to the soil helps maintain tilth. The hazard of erosion is slight. Potential is high for bermudagrass and medium for fescue.

This soil has medium potential for eastern cottonwood, pecan, and green ash. Excess surface water and the very slow permeability restrict woodland management. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Because of flooding, low strength, and the high shrink-swell potential, this soil has low potential for most urban and recreational uses.

This soil has high potential as habitat for wildlife. The amount of wildlife present is dependent upon the available food and cover. Food and cover are limited in tilled areas.

This Lela soil is in capability subclass IIIw and in woodland suitability group 3w5; it is not assigned to a range site.

35—Lela silty clay, rarely flooded, 1 to 3 percent slopes. This deep, somewhat poorly drained, very gently sloping soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes are smooth to gently undulating in cultivated areas and have gilgai microrelief in undisturbed areas. Areas are 10 to 250 acres.

Typically, the surface layer is very dark grayish brown silty clay that grades to very dark brown clay to about 30 inches. The layer below that is dark reddish brown clay to about 40 inches. The underlying material is dark reddish brown clay to about 68 inches.

This soil is high in natural fertility and organic matter content. It is neutral to moderately alkaline in the surface layer and is moderately alkaline below that. In places, the underlying material is calcareous. Permeability is very slow, and the available water capacity is high. As the soil dries out, deep cracks form. The clayey surface layer and excess surface water are management problems. This soil can be worked only within a narrow range of moisture content.

Included in mapping and making up about 10 to 15 percent of the map unit are small areas of Garton soils. Individual areas of Garton soils generally are less than 1 acre.

Most of the acreage is used for cultivated crops. This soil has medium potential for row crops and small grains. Crops respond well to fertilizer, but lime generally is not needed. Row crops should be grown in a cropping system with other crops that produce enough residue to help control water erosion and maintain tilth. Irregular slopes make terracing impractical. Potential is medium for bermudagrass and fescue.

This soil has medium potential for eastern cottonwood, pecan, and green ash. Restricted internal drainage limits woodland management. If this soil is used for commercial timber production, grazing by livestock is not recommended.

Because of flooding, low strength, and the high shrink-swell potential, this soil has low potential for most urban and recreational uses.

The soil has high potential as habitat for wildlife. The amount of wildlife present is dependent upon available food and cover. Food and cover are limited in tilled areas.

This Lela soil is in capability subclass IIIe and in woodland suitability group 3w5; it is not assigned to a range site.

36—Lynnville Variant silty clay, occasionally flooded. This deep, somewhat poorly drained, gently undulating to concave soil is on the Arkansas River flood plain. This soil is subject to occasional flooding. It commonly is adjacent to bodies of water or small streams on the upland side of the Arkansas River flood plain. Slopes are mainly less than 1 percent but range from 0 to 2 percent. Areas are 30 to 300 acres.

Typically, the surface layer is dark brown silty clay about 10 inches thick. The underlying material is dark brown and reddish brown silty clay loam stratified with thin strata of silty clay to about 75 inches.

This soil is high in natural fertility and organic matter content. It is moderately alkaline and calcareous throughout. Permeability is moderately slow, and the available water capacity is high. A high water table is at a depth of 1 to 3 feet during winter and spring.

Included in mapping are a few intermingled areas of Latanier, Moreland, and Wabbaseka soils, which commonly are in slightly higher positions on the landscape. The included soils make up about 10 to 15 percent of the map unit. Individual areas generally are less than 3 acres.

Most of the acreage of this map unit is used for cultivated crops, as woodland, or as habitat for wildlife. Because of flooding and a high water table, this soil has low potential for cultivated crops. If it is cultivated, warm-season crops such as soybeans are best suited. Crops generally respond to fertilizer, but lime is not needed. Potential is high for fescue and bermudagrass. White Dutch clover is moderately suited, but flooding can cause the loss of this crop in some areas. To maintain tame pasture, control of brush and weeds is needed.

This soil has high potential for pecan, eastern cottonwood, and American sycamore. The use of equipment is limited during wet seasons. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Because of seasonal wetness and flooding, this soil has low potential for most urban and recreational uses.

This soil has high potential as habitat for wildlife. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

This Lynnville Variant soil is in capability subclass IVw and in woodland suitability group 2w5; it is not assigned to a range site.

37—McKamie loam, 3 to 5 percent slopes. This deep, well drained, gently sloping soil is on old alluvial terraces near the Arkansas River flood plain. Slopes are smooth and convex. Areas are 5 to 130 acres.

Typically, the surface layer is brown loam about 5 inches thick. The upper part of the subsoil is red clay, and the lower part is red silty clay loam to about 55 inches. The underlying material to about 63 inches is red silty clay loam stratified with thin layers of silt loam and very fine sandy loam.

This soil is low in natural fertility and organic matter content. The surface layer and upper part of the subsoil are slightly acid to very strongly acid, and the lower part of the subsoil is neutral to alkaline and in places is calcareous. Permeability is very slow, and the available water capacity is medium.

Included in mapping are small areas of Stigler and Kamie soils, small areas of soils that have moderate to severe erosion, and small areas of McKamie soils on 2 to 3 percent slopes. The included soils make up about 20 percent of the map unit. Individual areas generally are less than 2 acres.

Most of the acreage has been cropped, but presently it is used for tame pasture. Because erosion is a hazard, the potential is low for row crops and small grains. The very slow permeability of the subsoil intensifies the hazard of erosion. Potential is medium for bermudagrass and low for tall fescue. Control of brush and weeds is needed to maintain tame pasture. On hayland, this is accomplished by mowing. Pasture plants respond to fertilizer and lime.

Potential is medium for southern red oak, shortleaf pine, and loblolly pine. This soil has low potential for most urban and recreational uses. The main limitations are the very slow permeability, the high shrink-swell potential, and low strength.

The potential of this soil as habitat for wildlife is high.

This McKamie soil is in capability subclass IVe and in woodland suitability group 4c8; it is not assigned to a range site.

38—McKamie loam, 5 to 12 percent slopes, eroded. This deep, well drained, sloping to strongly sloping soil is on old alluvial terraces near the Arkansas River flood plain. Slopes are smooth and convex. Areas are 5 to 80 acres.

Typically, the surface layer is reddish brown loam about 3 inches thick. The subsoil is red clay to a depth of about 36 inches. The underlying material is red, stratified clay, clay loam, and sandy clay loam to about 65 inches.

Erosion has thinned the surface layer and created rills and a few gullies. Thickness of the surface layer varies considerably within short distances. In about half of a mapped area, the surface layer is 1 to 3 inches thick and generally has some subsoil because it has been mixed during cultivation. In the other half, the surface layer is 3 to 6 inches thick. Some small areas are not eroded. The surface layer generally is thinnest near rills and gullies.

This soil is low in natural fertility and organic matter content. The surface layer is slightly acid to strongly acid except where the surface has been limed. The upper part of the subsoil is medium acid to very strongly acid, and the lower part is neutral to alkaline and in places is calcareous. Permeability is very slow, and the available water capacity is medium.

Included in mapping are small areas of Kamie soils and small areas of McKamie soils, eroded, that have slopes of 3 to 5 percent. The included soils make up about 10 to 20 percent of the map unit. Individual areas generally are less than 2 acres.

Most of the acreage is used for pasture. Because of erosion and the severe hazard of additional erosion, this soil has low potential for row crops and small grains. Potential is low for bermudagrass and tall fescue. Control of brush and weeds is needed to maintain pasture. Pasture plants respond to fertilizer and lime.

This soil has medium potential for southern red oak, shortleaf pine, and loblolly pine. This soil has low potential for most urban and recreational uses. The main limitations are the very slow permeability, the high shrink-swell potential in the subsoil, and low strength.

This soil has high potential as habitat for wildlife.

This McKamie soil is in capability subclass VIe and in woodland suitability group 4c8; it is not assigned to a range site.

39—Moreland silty clay, rarely flooded. This deep, somewhat poorly drained, nearly level to gently undulating soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes are smooth to gently undulating or slightly concave and range from 0 to 2 percent. Areas are 10 to 300 acres.

Typically, the surface layer is dark reddish brown silty clay about 15 inches thick. The subsoil extends to a depth of about 63 inches or more and is dark reddish brown silty clay; the lower part has a few thin strata of brown silty clay loam.

This soil is high in natural fertility and organic matter content. It is neutral or mildly alkaline in the surface layer and is moderately alkaline and calcareous in the subsoil. Deep cracks form in the soil as it dries. Permeability is very slow, and the available water capacity is high. The clayey surface layer and excess surface water are management problems. The soil can be worked only within a narrow range of moisture content. Wetness causes difficulty in establishing uniform stands of crops, particularly in the swale areas on undulating surfaces. Surface drainage usually is needed.

Included in mapping are Moreland soils that have a silt loam or silty clay loam surface layer. Also included are small areas of Latanier soils on the crests of undulating areas. The included soils make up about 10 to 15 percent of the map unit. Individual areas generally are less than 1 acre.

Most of the acreage is used for cultivated crops. This soil has high potential for row crops and small grains. Crops respond well to fertilizer, but lime generally is not needed. Returning crop residue to the soil helps maintain tilth and fertility. The hazard of erosion is slight. Potential is high for hay and pasture.

This soil has medium potential for eastern cottonwood and American sycamore. Excess surface water and restricted internal drainage limit woodland management. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Figure 3.—Because of the high shrink-swell potential, deep cracks form on Moreland silty clay, rarely flooded, as it dries.

Because of flooding and the high shrink-swell potential, this soil has low potential for most urban and recreational uses (fig. 3).

This soil has high potential as habitat for wildlife. The amount of wildlife present is dependent on the available food and cover. Food and cover are limited in tilled areas.

This Moreland soil is in capability subclass IIIw and in woodland suitability group 3w5; it is not assigned to a range site.

40—Moreland silty clay loam, rarely flooded. This deep, somewhat poorly drained, nearly level to gently undulating soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes are smooth and range from 0 to 2 percent. Areas are 10 to 500 acres.

Typically, the surface layer is dark reddish brown silty clay loam about 17 inches thick. The subsoil extends to a depth of 63 inches or more and is dark reddish brown silty clay. In places the lower part of the subsoil has a few thin strata of silt loam or silty clay loam.

This soil is high in natural fertility and organic matter content. It is neutral to mildly alkaline in the surface layer and is moderately alkaline and calcareous in the subsoil. Permeability is very slow, and the available water capacity is high. Because of the silty clay loam surface

layer, this soil can be tilled only within a medium range of moisture content. Wetness causes difficulty in establishing uniform stands of crops, particularly in the swale areas on undulating surfaces.

Included in mapping are Moreland soils that have a clayey surface layer, soils that are calcareous in the surface layer, and soils that have a loamy surface layer that is 20 to 25 inches thick. The included soils make up about 10 to 15 percent of the map unit. Individual areas generally are less than 1 acre.

Most of the acreage is used for cultivated crops. This soil has high potential for row crops and small grains. Crops respond well to fertilizer, but lime generally is not needed. Returning crop residue to the soil helps maintain tilth. The hazard of erosion is slight. Surface drainage is needed in places. Potential is high for hay and pasture.

This soil has medium potential for eastern cottonwood and American sycamore. Excess surface water and restricted internal drainage limit woodland management. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Because of rare flooding and the high shrink-swell potential, this soil has low potential for most urban and recreational uses.

This soil has high potential as habitat for wildlife. The amount of wildlife present is dependent upon the available food and cover. Food and cover are limited in tilled areas.

This Moreland soil is in capability subclass IIIw and in woodland suitability group 3w5; it is not assigned to a range site.

41—Moreland silty clay loam, frequently flooded. This deep, somewhat poorly drained, nearly level to very gently sloping soil is along small drainageways on the Arkansas River flood plain. This soil is subject to frequent flooding. Slopes are smooth and convex or very gently undulating and range from 0 to 2 percent. Individual areas are 5 to 100 acres.

Typically, the surface layer is dark brown silty clay loam about 13 inches thick. The subsoil extends to a depth of 63 inches or more and is dark reddish brown silty clay. In places a few thin strata of silt loam or silty clay loam are in the lower part of the subsoil.

This soil is high in natural fertility and organic matter content. It is neutral to moderately alkaline in the surface layer and is moderately alkaline and calcareous in the subsoil. Permeability is very slow, and the available water capacity is high. This soil is wet in winter and early spring. It is strongly dissected by one or more meandering stream channels.

Included in mapping are small areas of Lela soils and small areas of Moreland silty clay. The included soils make up about 10 to 20 percent of the map unit. Individual areas generally are less than 3 acres.

Most of the acreage of this soil is used as pasture or woodland. Because of flooding, this soil has low potential for cultivated crops. It has high potential for tall fescue and bermudagrass. The periods of brief flooding generally are not damaging to most adapted pasture plants. However, floodwater often damages fences and deposits weed seeds, thus increasing weed problems. To maintain tame pasture, control of brush and weeds is needed. Plants respond to fertilizer, but lime is not needed.

This soil has medium potential for eastern cottonwood and American sycamore. The use of equipment is limited during wet seasons. The large number of streams also restrict the use of equipment. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Because of seasonal wetness and flooding, this soil has low potential for most urban and recreational uses.

This soil has high potential as habitat for wetland and woodland wildlife. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

This Moreland soil is in capability subclass Vw and in woodland suitability group 3w5; it is not assigned to a range site.

42—Neff silt loam, occasionally flooded. This deep, moderately well drained, nearly level to very gently sloping soil is on flood plains. This soil is subject to occasional flooding. Slopes are smooth and convex and range from 0 to 2 percent. Areas are 5 to 1,500 acres.

Typically, the surface layer is dark brown silt loam about 14 inches thick. The upper part of the subsoil is dark yellowish brown silt loam, and the lower part of the subsoil is dark yellowish brown silty clay loam that has gray mottles to a depth of about 82 inches.

This soil is medium in natural fertility and organic matter content. It is acid throughout except in the surface layer where lime has been applied. Permeability is moderately slow, and the available water capacity is high. In winter and spring, wetness limits the cultivating and harvesting of certain crops.

Included in mapping are small areas of the well drained Rexor soils on the more sloping part of the flood plain and small areas of the somewhat poorly drained Cupco soils in slightly concave areas. The included soils make up about 10 to 20 percent of the map unit. Individual areas generally are less than 5 acres.

Most of the acreage is used for pasture or hay, although some areas are used for cultivated crops. This soil has medium potential for row crops and small grains. The main limitations are occasional flooding and seasonal wetness. It has high potential for tall fescue, bermudagrass, and white clover (fig. 4). Field drainage ditches help remove excess surface water, but they do not completely eliminate internal wetness. Flooding damages crops and fences. Returning crop residue to

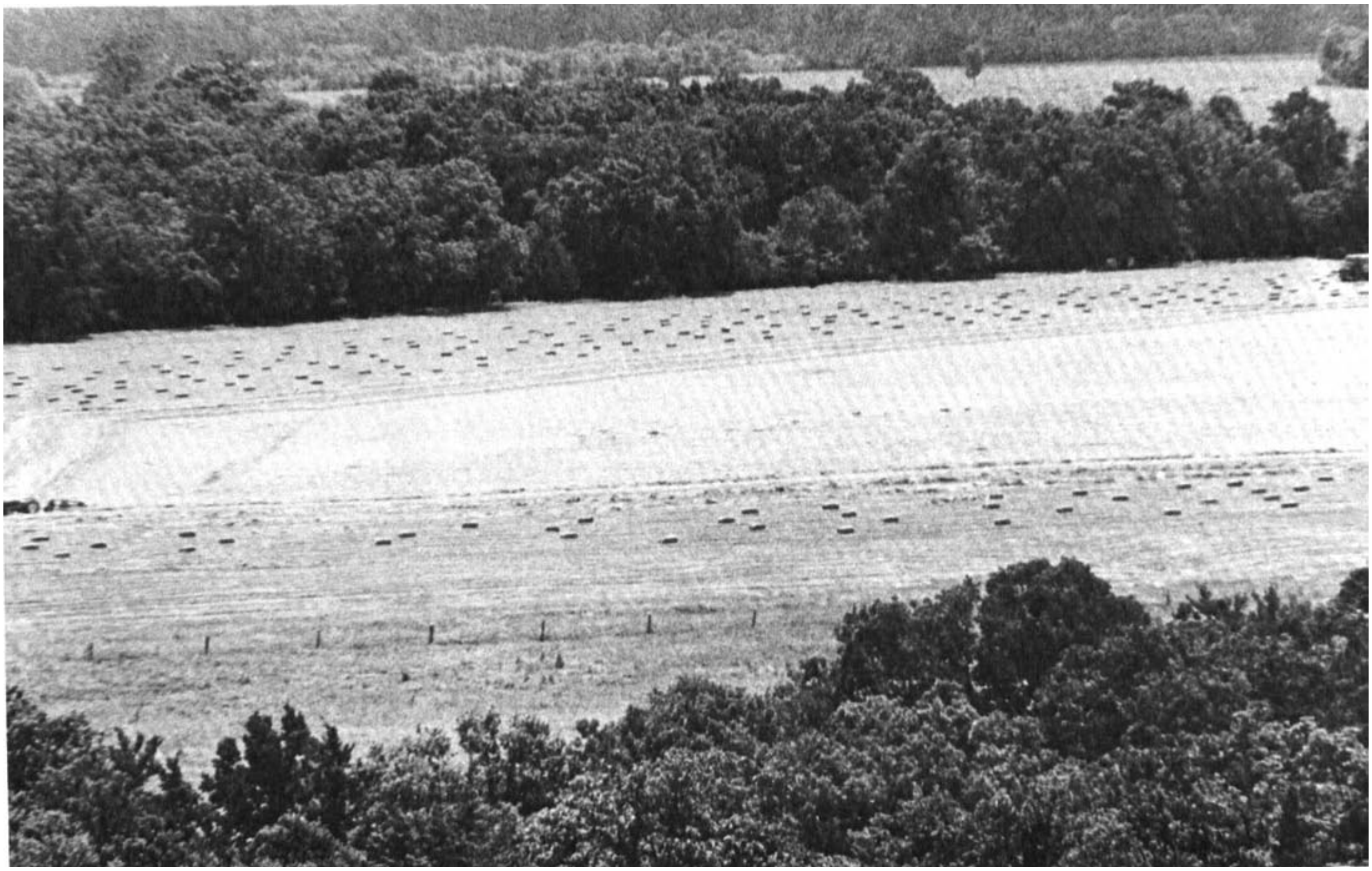


Figure 4.—Hay is harvested from improved grasses on Neff silt loam, occasionally flooded; the soil has medium potential for crops.

the soil helps maintain good tilth. Crops respond to fertilizer and lime.

This soil has medium potential for loblolly pine, shortleaf pine, and eastern cottonwood. The use of equipment is restricted during wet seasons. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Because of seasonal wetness and occasional flooding, this soil has low potential for most urban and recreational uses.

The potential for use of this soil as habitat for wildlife is high.

This Neff soil is in capability subclass IIw and in woodland suitability group 3w8; it is not assigned to a range site.

43—Neff and Rexor silt loams, frequently flooded. This map unit consists of deep, moderately well drained and well drained, nearly level to very gently sloping soils that are mainly on narrow flood plains. These soils are subject to frequent flooding. The flood plains are strongly dissected by one or more meandering stream channels. Slopes are smooth and convex or very gently undulating and range from 0 to 2 percent. Neff and Rexor soils are in an irregular pattern on the landscape. Individual areas of each soil commonly are large enough to map separately, but because of present and predicted land use, they were mapped as one unit. Most areas have both soils, but a few areas have only one of the soils.

About 65 percent of the map unit is Neff silt loam. Typically, the surface layer is dark brown silt loam about 9 inches thick. The upper part of the subsoil is dark yellowish brown silt loam to a depth of about 14 inches, and the lower part is dark yellowish brown silt loam that has gray mottles to about 65 inches.

Natural fertility and organic matter content are medium. This soil is acid throughout except in the surface layer where lime has been applied. Permeability

is moderately slow, and the available water capacity is high. A high water table is 1/2 foot to 2 1/2 feet below the surface during winter and spring.

About 20 percent of the map unit is Rexor silt loam. Typically, the surface layer is brown silt loam about 11 inches thick. The upper part of the subsoil is dark yellowish brown silty clay loam to about 54 inches. The lower part is yellowish brown loam to about 65 inches. In places mottles in shades of gray and brown are below a depth of 30 inches.

Rexor soils are medium acid to very strongly acid except in the surface layer where lime has been applied. Natural fertility and organic matter content are medium. Permeability is moderate, and the available water capacity is high.

Included are small areas of somewhat poorly drained Cupco soils in slightly concave areas and small areas of soils that are similar to Neff soils except that they are more sandy throughout. The included soils make up about 10 to 20 percent of the map unit. Individual areas generally are less than 3 acres.

Most of the acreage is used for pasture or woodland. Because of flooding and the dissecting stream channels, the potential for cultivated crops is low. Potential is high for tall fescue, bermudagrass, and white clover. The periods of brief flooding generally are not damaging to most adapted pasture plants. However, flooding commonly damages fences and, by depositing weed seeds, increases weed problems. To maintain tame pasture, control of brush and weeds is needed. Pasture plants respond to fertilizer and lime.

These soils have medium potential for loblolly pine, shortleaf pine, and eastern cottonwood. The use of equipment is limited during wet seasons and also by floodwater from the stream channels on these soils.

Because of seasonal wetness and frequent flooding, these soils have low potential for most urban and recreational uses.

These soils have high potential as habitat for wildlife. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

These Neff and Rexor soils are in capability subclass Vw; they are not assigned to range sites. Neff soil is in woodland suitability group 3w8; Rexor soil is in woodland suitability group 2w8.

44—Norwood silty clay loam, rarely flooded, 0 to 1 percent slopes. This deep, well drained, nearly level soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes are smooth or very gently undulating and are less than 1 percent. Areas are 10 to 200 acres.

Typically, the surface layer is reddish brown silty clay loam about 9 inches thick. The subsoil is reddish brown silty clay loam to a depth of about 25 inches. The underlying material to 68 inches or more is brown and reddish brown silt loam and very fine sandy loam in the upper part. The lower part is dark reddish brown silty clay loam and silty clay.

This soil is high in natural fertility and organic matter content. The surface layer is mildly alkaline to moderately alkaline and in places is calcareous; in places where it has been highly fertilized, it ranges to neutral. The subsoil is moderately alkaline and calcareous. Permeability is moderate, and the available water capacity is high. Because of the silty clay loam surface layer, this soil can be tilled only within a medium range of moisture content.

Included in mapping are a few intermingled areas of Coushatta and Severn soils. The included soils make up about 10 to 15 percent of this map unit. Individual areas generally are less than 1 acre.

Most of the acreage of this soil is used for cultivated crops. Potential is high for row crops and small grains. Returning crop residue to the soil helps maintain tilth. The hazard of erosion is slight. Lime is not needed, but crops respond to fertilizer.

Potential is high for hay and pasture. Potential is also high for eastern cottonwood, American sycamore, and black walnut. There are no significant limitations for pasture, hay, or woodland use and management. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Because this soil is subject to rare flooding, it has low potential for most urban uses and for use as camp areas. It has high potential for use as picnic areas and playgrounds.

This soil has high potential as habitat for wildlife. The numbers of wildlife are limited because food and cover are scarce in many tilled areas.

This Norwood soil is in capability class I and in woodland suitability group 2o4; it is not assigned to a range site.

45—Norwood silty clay loam, rarely flooded, undulating. This deep, well drained, gently undulating soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes are short and irregular and dominantly are 1 to 3 percent. Areas are 10 to 150 acres.

Typically, the surface layer is dark reddish brown silty clay loam about 9 inches thick. The subsoil is reddish brown silty clay to a depth of about 18 inches. The underlying material is reddish brown and dark reddish brown silt loam and silty clay loam in the upper part. In the lower part it is brown fine sandy loam to about 65 inches.

This soil is high in natural fertility and organic matter content. The surface layer is noncalcareous or calcareous and mildly alkaline or moderately alkaline; where it has been highly fertilized, it ranges to neutral. The subsoil is moderately alkaline and calcareous. Permeability is moderate, and the available water capacity is high. Because of the silty clay loam surface

layer, this soil can be tilled only within a medium range of moisture content.

Included in mapping are a few intermingled areas of Coushatta and Severn soils. The included soils make up about 15 to 20 percent of this map unit. Individual areas generally are less than 1 acre.

Most of the acreage of this soil is used for cultivated crops. Potential is high for row crops and small grains. Row crops should be grown in a cropping system with other crops that produce enough residue to help control water erosion and maintain tilth. Irregular slopes make terracing impractical. The hazard of flooding is slight. Lime is not needed, but crops respond to fertilizer.

The potential is high for hay and pasture. Potential is also high for eastern cottonwood, American sycamore, and black walnut. There are no significant limitations for pasture, hay, or woodland use and management. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Because this soil is subject to rare flooding, it has low potential for most urban uses or for use as camp areas. It has high potential for use as picnic areas and medium potential for playgrounds.

This soil has high potential as habitat for wildlife, but the numbers of wildlife are limited because of the scarcity of food and cover in many tilled areas.

This Norwood soil is in capability subclass IIe and in woodland suitability group 2o4; it is not assigned to a range site.

46—Norwood loam, rarely flooded. This deep, well drained, nearly level to very gently undulating soil is on the Arkansas River flood plain. This soil is rarely flooded. Slopes are 0 to 1 percent. Areas are 10 to 200 acres.

Typically, the surface layer is brown loam about 9 inches thick. The upper part of the underlying material is reddish brown silty clay loam to a depth of about 36 inches. The lower part of the underlying material to about 62 inches is yellowish red fine sandy loam grading to reddish brown silty clay loam and silty clay.

This soil is high in natural fertility and organic matter content. The surface layer is mildly alkaline or moderately alkaline and in places is calcareous; where it has been highly fertilized, it ranges to neutral. The subsoil is moderately alkaline and calcareous. Permeability is moderate, and the available water capacity is high. The soil has good tilth and can be worked within a wide range of moisture content.

Included in mapping are a few intermingled areas of Norwood silty clay loam and Severn and Coushatta soils. The included soils make up about 10 to 15 percent of this map unit. Individual areas generally are less than 1 acre.

Most of the acreage of this soil is used for cultivated crops. It has high potential for row crops and small grains. Returning crop residue to the soil helps maintain good tilth. The hazard of erosion is slight. Lime is not needed, but crops respond to fertilizer.

Potential is high for hay and pasture. Potential is also high for eastern cottonwood, American sycamore, and black walnut. There are no significant limitations for pasture, hay, or woodland uses and management. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Because this soil is rarely flooded, it has low potential for most urban uses and for use as camp areas. Potential is high for uses as picnic areas and playgrounds.

This soil has high potential as habitat for wildlife. Food and cover in tilled areas, however, are scarce.

This Norwood soil is in capability class I and in woodland suitability group 2o4; it is not assigned to a range site.

47—Octavia stony loam, 10 to 25 percent slopes. This deep, well drained, strongly sloping to steep, stony soil is on mountain foot slopes and colluvial benches. The slopes between benches are steeper and commonly more stony than the rest of the mapped areas. Areas are 20 to 500 acres.

Typically, the surface layer is very dark grayish brown stony loam about 5 inches thick. The subsurface layer is yellowish brown stony loam about 5 inches thick. The subsoil extends to a depth of 65 inches. The upper part of the subsoil is yellowish red gravelly clay loam, the middle part is red clay, and the lower part is coarsely mottled red, strong brown, and light brownish gray clay.

This soil is low in natural fertility and organic matter content. Reaction is acid throughout. Permeability is moderately slow, and the available water capacity is medium. The root zone is deep and, except where fragments of sandstone are numerous, is easily penetrated by plant roots.

Included in mapping are soils, on residual benches, that have a clayey subsoil and are underlain by shale or interbedded sandstone and shale at a depth of 40 to 60 inches. These soils make up about 10 percent of this map unit. Individual areas generally are less than 5 acres.

This map unit is used for woodland. Potential is medium for shortleaf pine, loblolly pine, and northern red oak. Fragments of sandstone on the surface hinder woodland harvesting and planting but do not prevent these operations. The hazard of erosion is low to medium. Revegetating unused logging roads helps control erosion.

This soil has low potential for cultivated crops, pasture, and most urban and recreational uses. The main limitations are surface stoniness and slope.

Potential of this soil is high as habitat for white-tailed deer, squirrel, and turkey.

This Octavia soil is in capability subclass VIIs and in woodland suitability group 4x8; it is not assigned to a range site.

48—Octavia-Carnasaw complex, cool, 15 to 35 percent slopes. This map unit consists of small areas of Octavia and Carnasaw soils that are so intermingled that they could not be separated at the scale selected for mapping. They are well drained, deep soils on long, narrow parallel benches and the steeper part of side slopes. The areas generally are 1/8 to 3/8 mile in width and range to as much as 10 miles in length; they are from 80 to 1,000 acres in size. Individual areas of each soil are 2 to 20 acres.

Octavia stony fine sandy loam makes up about 55 percent of each map unit. Typically, the surface layer is dark grayish brown stony fine sandy loam about 3 inches thick. The subsurface layer is yellowish brown stony fine sandy loam about 3 inches thick. The subsoil extends to a depth of about 65 inches. The upper part is strong brown gravelly loam, the middle part is strong brown grading to yellowish red gravelly clay loam, and the lower part is coarsely mottled red, strong brown, and light gray clay.

Octavia soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is moderately slow, and the available water capacity is medium. The root zone is deep and, except where fragments of sandstone are numerous, is easily penetrated by plant roots.

Carnasaw stony loam makes up about 25 percent of the map unit. Typically, the surface layer is brown stony loam about 3 inches thick, and the subsurface layer is brown gravelly loam about 5 inches thick. The subsoil extends to a depth of about 51 inches. The upper part is yellowish red clay loam, the middle part is red clay, and the lower part is mottled, gray and red shaly clay. The underlying material is gray and yellowish brown shale that is weathered in the upper part.

Carnasaw soil is low in natural fertility and organic matter content. It is acid throughout. Permeability is slow, and the available water capacity is medium.

Included in mapping are small areas of Caston and Pirum soils. Also included are small areas of loamy soils that have a gravelly or cobbly subsoil and are underlain by sandstone bedrock at a depth of 20 to 40 inches. The included soils make up 20 percent of the map unit. Individual areas generally are less than 3 acres.

Potential is low for cultivated crops, most urban and recreational uses, and for tame pasture. Steep slope and large stones on the surface are severe limitations and are difficult to overcome.

Most of the acreage is used for woodland. Potential is medium for white oak, northern red oak, loblolly pine, and shortleaf pine. Concerns in management are preventing fires, controlling erosion in cut-over areas, and controlling growth of hardwood trees in pine stands to help the establishment and growth of pine. Revegetating unused logging roads helps control erosion.

These soils have high potential as habitat for white-tailed deer, squirrel, and turkey.

These Octavia and Carnasaw soils are in capability subclass VIIs and in woodland suitability group 4x9; they are not assigned to a range site.

49—Oklared fine sandy loam, rarely flooded. This deep, well drained, gently undulating soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes range from 0 to 3 percent but generally are less than 1 percent. Areas are 40 to 500 acres.

Typically, the surface layer is dark brown fine sandy loam about 6 inches thick. The underlying material to a depth of about 63 inches is brown, light brown, and reddish brown fine sandy loam, loamy fine sand, and very fine sandy loam.

This soil is high in natural fertility and medium in organic matter content. Reaction is moderately alkaline and calcareous throughout. Permeability is moderately rapid, and the available water capacity is medium. The soil has good tilth and can be worked within a wide range of moisture content. In the undulating areas, the concave surfaces are wet for slightly longer periods following rainfall.

Included in mapping are a few intermingled areas of Kiomatia, Norwood, and Severn soils. The included soils make up about 10 to 15 percent of this map unit. Individual areas generally are less than 1 acre.

Most of the acreage of this soil is used for cultivated crops. It has high potential for row crops and small grains. Row crops should be grown in a cropping system with other crops that produce sufficient residue to help control water erosion and maintain tilth. Irregular slopes make terracing impractical. The hazard of flooding is slight. Lime seldom is needed, but crops respond to fertilizer.

Potential is high for hay and pasture. This soil also has high potential for eastern cottonwood, American sycamore, pecan, and black walnut. There are no significant limitations for pasture, hay, or woodland use and management. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Because of the flooding hazard, this soil has low potential for most urban uses and for camp areas. Potential is high for use as picnic areas and playgrounds.

This soil has high potential as habitat for wildlife. The number of wildlife present is dependent upon the amount of food and cover present. In tilled areas food and cover are limited.

This Oklared soil is in capability class I and woodland suitability group 2o4; it is not assigned to a range site.

50—Pirum-Carnasaw-Caston complex, cool, 35 to 60 percent slopes. This map unit consists of small areas of Pirum, Carnasaw, and Caston soils that are so intermingled that they could not be separated at the scale selected for mapping. They are well drained, moderately deep and deep, steep, stony soils commonly on north slopes of mountains. Sandstones cover 10 to 40 percent of the surface. Areas are 700 to 2,600 feet in width and range to as much as 10 miles in length; they are 60 acres to more than 1,000 acres. Individual areas of each soil are 1/4 acre to 3 acres.

Pirum stony fine sandy loam makes up about 30 percent of the map unit. Typically, the surface layer is brown stony fine sandy loam about 5 inches thick. The subsurface layer is yellowish brown gravelly fine sandy loam about 5 inches thick. The subsoil is yellowish red gravelly clay loam to about 24 inches. The underlying material is hard, tilted sandstone.

Pirum soil is low in natural fertility and organic matter content. The soil is acid throughout. Permeability is moderate, and the available water capacity is low.

Carnasaw stony loam makes up about 30 percent of the map unit. Typically, the surface layer is dark grayish brown stony loam about 4 inches thick. The subsurface layer is light yellowish brown gravelly loam about 5 inches thick. The subsoil extends to about 48 inches. The upper part is yellowish red clay loam, the middle part is red silty clay, and the lower part is yellowish red, mottled silty clay. The underlying material is shale bedrock that has interbedded layers of sandstone.

Carnasaw soil is low in natural fertility and organic matter content. The soil is acid throughout. Permeability is slow, and the available water capacity is medium.

Caston stony fine sandy loam makes up about 25 percent of the map unit. Typically, the surface layer is brown stony fine sandy loam about 4 inches thick, and the subsurface layer is yellowish brown very gravelly fine sandy loam about 6 inches thick. The subsoil extends to about 80 inches. The upper part is strong brown very gravelly fine sandy loam, the middle part is yellowish red very gravelly clay loam, and the lower part is strong brown, mottled very gravelly clay loam.

Caston soil is low in natural fertility and organic matter content. The soil is acid throughout. Permeability is moderate, and the available water capacity is low.

Included in mapping are small areas of soils that have slopes of 60 to 70 percent and small areas, in ravines, of rock flows that range from 3 to 15 feet in thickness and are 25 to 150 feet wide and 50 to 1,000 feet long. Also included are small areas of Clebit soils on the upper part of the slope and small areas of Octavia soils on benches and in cove positions. The included soils make up 15 percent of this map unit. Individual areas generally are less than 1 acre.

These soils have low potential for cultivated crops, tame pasture, and most urban and recreational uses. Steep slope and large stones on the surface are severe limitations and are difficult to overcome.

Most of the acreage is used as woodland. Potential is medium for northern red oak, white oak, and hickory. Slopes are steep, and the hazard of erosion is high. Slope and surface stoniness restrict the use of logging equipment.

These soils have medium potential as habitat for white-tailed deer, squirrel, and turkey.

These soils are in capability subclass VIIs and in woodland suitability group 4r6; they are not assigned to a range site.

51—Pirum-Clebit complex, 2 to 5 percent slopes. This map unit consists of small areas of Pirum and Clebit soils that are so intermingled that they could not be separated at the scale selected for mapping. They are well drained, moderately deep and shallow soils on crests and side slopes on low ridges and on mountain crests. Areas are 5 to 200 acres. Individual areas of each soil are 1/10 acre to 5 acres.

Pirum fine sandy loam makes up about 55 percent of the map unit. Typically, the surface layer is brown fine sandy loam about 7 inches thick. The upper part of the subsoil is strong brown loam, and the lower part is yellowish red sandy clay loam to about 29 inches. The underlying material is hard sandstone.

Pirum soil is low in natural fertility and organic matter content. The soil is acid throughout except in the surface layer in areas where lime has been added. Permeability is moderate, and available water capacity is low.

Clebit gravelly fine sandy loam makes up about 20 percent of the map unit. Typically, the surface layer is brown gravelly fine sandy loam about 7 inches thick. The subsoil is strong brown cobbly fine sandy loam to about 16 inches. The underlying material is hard sandstone.

Clebit soil is low in natural fertility and organic matter content. The soil is acid throughout except in the surface layer in areas where lime has been added. Permeability is moderately rapid, and the availble water capacity is low.

Included in mapping are intermingled areas of Bengal soils and soils similar to Pirum soils except that they are 12 to 20 inches thick over sandstone bedrock. Also included are small areas of Shermore soils on foot slopes. The included soils make up about 25 percent of the map unit. Individual areas generally are less than 2 acres.

Most of the acreage is used for pasture; some areas of these soils are used as woodland. Because some of the soils are shallow, the potential for cultivated crops is low. If row crops are grown, terraces and contour tillage are needed to reduce erosion. Returning crop residue to the soil helps increase water intake. Potential is medium for bermudagrass, bahiagrass, and tall fescue. Adapted legumes are arrowleaf clover, hop clover, and Korean, Kobe, and sericea lespedezas. Crops, introduced

grasses, and legumes respond to fertilizer and lime. Controlling brush and weeds is necessary for pasture; generally on hay meadows, this is accomplished by mowing.

The potential is medium for native grass. Controlling brush, proper grazing, and preventing fires help maintain or improve the quantity and quality of native grass.

Pirum soil has medium potential for shortleaf pine and loblolly pine. Because of shallow depth, Clebit soil has low potential for woodland. There are no other significant limitations for woodland use and management.

Pirum soil has medium potential for use for dwellings without basements, small commercial buildings, and local roads and streets. Because of soil depth, the potential is low for use of the soils as septic tank absorption fields, sewage lagoons, and trench type sanitary landfills. Because of its shallowness, Clebit soil has low potential for most urban uses.

The potential is high for most recreational uses and as habitat for bobwhite quail, mourning dove, cottontail rabbit, and white-tailed deer. Adequate food and cover are essential if large numbers of wildlife are to be maintained.

These Pirum and Clebit soils are in capability subclass IVe. Pirum soil is in woodland suitability group 4o1; Clebit soil is in woodland suitability group 5d2. Pirum soil is in Sandy Savannah range site; Clebit soil is in Shallow Savannah range site.

52—Pirum-Clebit complex, 2 to 5 percent slopes, eroded. This map unit consists of small areas of eroded Pirum and Clebit soils that are so intermingled that they could not be separated at the scale selected for mapping. They are well drained, moderately deep and shallow soils on crests and side slopes of low ridges and on mountain crests. Erosion has thinned the surface layer of these soils and created rills and a few gullies. The surface layer varies considerably in thickness within a short distance and generally is thinnest near rills and gullies. Some areas between rills have eroded only slightly. Areas are 5 to 1,000 acres. Individual areas of each soil are less than 2 acres.

Pirum fine sandy loam makes up about 55 percent of the map unit. Typically, the surface layer is dark grayish brown fine sandy loam about 2 inches thick. The subsoil is yellowish red clay loam to about 22 inches. The underlying material is hard sandstone.

Pirum soil is low in natural fertility and organic matter content. Reaction is acid throughout except where the surface has been limed. Permeability is moderate, and the available water capacity is low.

Clebit gravelly fine sandy loam makes up about 20 percent of the map unit. Typically, the surface layer is brown gravelly fine sandy loam about 4 inches thick. The subsoil is strong brown cobbly fine sandy loam to about 10 inches. The underlying material is hard sandstone.

Clebit soil is low in natural fertility and organic matter content. Reaction is acid throughout except where the surface has been limed. Permeability is moderately rapid, and the available water capacity is low.

Included in mapping are intermingled areas of Bengal soils and soils similar to Pirum soils except that they are 12 to 20 inches thick over sandstone bedrock. Also included are small areas of Shermore soils on foot slopes. The included soils make up about 25 percent of the map unit. Individual areas generally are less than 2 acres.

Most of the acreage is used for pasture. Because the surface layer has been thinned by erosion and some of the soils are shallow, the potential for cultivated crops is low. If row crops are grown, terraces and contour tillage are needed to reduce erosion. Returning crop residue to the soil helps increase water intake. Potential is medium for bermudagrass, bahiagrass, and tall fescue. Adapted legumes are arrowleaf clover, hop clover, and Korean, Kobe, and sericea lespedezas. Fertilizer and lime are beneficial to crops, introduced grasses, and legumes. Controlling brush and weeds is necessary on pasture; generally it is accomplished on hay meadows by mowing.

Potential is medium for native grass. Controlling brush, proper grazing, and preventing wildfires help maintain or improve the quality and quantity of native grass.

Pirum soil has medium potential for loblolly pine and shortleaf pine. Because of its shallowness, Clebit soil has low potential for woodland. There are no other significant limitations for woodland use and management.

Pirum soil has medium potential for use for dwellings without basements, small commercial buildings, and local roads and streets. Because of soil depth, the potential is low for use of the soils as septic tank absorption fields, sewage lagoons, and trench type sanitary landfills. Because of its shallowness, Clebit soil has low potential for most urban uses.

These soils have high potential for most recreational uses and for use as habitat for bobwhite quail, mourning dove, cottontail rabbit, and white-tailed deer. Adequate food and cover are essential if large numbers of wildlife are to be maintained.

These Pirum and Clebit soils are in capability subclass IVe. Pirum soil is in woodland suitability group 4o1; Clebit soil is in woodland suitability group 5d2. Pirum soil is in Sandy Savannah range site; Clebit soil is in Shallow Savannah range site.

53—Pirum-Octavia-Panama association, steep. This map unit consists of moderately deep and deep, well drained, steep soils in a regular and repeating pattern. The landscape mainly is south-facing slopes in the Ouachita Mountains that are benched on the middle and lower part of the slope. The slope gradient commonly is 30 to 50 percent, but about 15 percent of the mapped

areas consists of benches that have slopes of 20 to 30 percent. The benches generally are 100 to 300 feet wide and are joined on upper and lower boundaries by steeper slopes. The Pirum soils are on the upper part of slopes and on the slopes between benches, and the Octavia and Panama soils are on the benches and in cove positions. All of these soils formed in material that weathered from interbedded sandstone and shale. Areas mostly are long and narrow, from 800 to 2,400 feet wide and as much as 10 miles long; they range from 20 to 1,000 acres or more. Individual areas of each soil range from 2 acres to 25 acres.

The moderately deep, well drained Pirum soils make up about 30 percent of the map unit. Typically, the surface layer is brown stony fine sandy loam about 6 inches thick. The subsoil extends to a depth of about 30 inches. The upper part is strong brown loam, and the lower part is yellowish red sandy clay loam. The underlying material is hard, fractured and tilted sandstone.

Pirum soils are low in natural fertility and organic matter content. They are acid throughout. Permeability is moderate, and the available water capacity is low.

The deep, well drained Octavia soils make up about 25 percent of the map unit. Typically, the surface layer is dark grayish brown stony fine sandy loam about 3 inches thick, and the subsurface layer is brown stony fine sandy loam about 3 inches thick. The subsoil extends to a depth of about 70 inches. The upper part is yellowish brown gravelly fine sandy loam, the middle part is strong brown gravelly sandy clay loam grading to yellowish red gravelly clay loam, and the lower part is mottled red, brownish yellow, and gray clay.

Octavia soils are low in natural fertility and organic matter content. They are acid throughout. Permeability is moderately slow, and the available water capacity is medium. The root zone is deep and except for fragments of sandstone is easily penetrated by plant roots.

The deep, well drained Panama soils make up about 20 percent of the map unit. Typically, the surface layer is very dark grayish brown stony fine sandy loam about 5 inches thick, and the subsurface layer is yellowish brown stony fine sandy loam about 5 inches thick. The subsoil extends to a depth of about 65 inches. The upper part is strong brown stony fine sandy loam, the middle part is yellowish red very gravelly sandy clay loam grading to very gravelly clay loam to about 42 inches, and the lower part is mottled brownish yellow, light gray, and red shaly clay.

Panama soils are low in natural fertility and organic matter content. They are acid throughout. Permeability is moderately slow, and the available water capacity is medium.

Included in mapping are a few areas of the well drained Clebit and Carnasaw soils. These soils are on upper slopes and, in some places, on mid slopes. The included soils make up about 25 percent of the map unit. Individual areas generally are less than 5 acres.

Most of the acreage is used as woodland (fig. 5). Potential is low to medium for shortleaf pine and loblolly pine. Concerns in management include controlling growth of hardwood trees to help the establishment of pine and preventing wildfires. The hazard of erosion is severe because of the steep slopes. Revegetating unused logging roads helps control erosion. Surface stoniness and steep slopes are limitations to use of logging equipment.

These soils have low potential for cultivated crops and tame pasture. The potential is low for native pasture because of surface stoniness, steep slope, and plant competition from hardwoods.

Because of steep slopes and surface stoniness these soils have low potential for urban and recreational uses.

These soils have high potential for use as habitat for wildlife if adequate food and cover are maintained.

The soils in this association are in capability subclass VIIs; they are not assigned to a range site. Pirum soils are in woodland suitability group 5r3, and Octavia and Panama soils are in woodland suitability group 4r3.

54—Pocola silt loam, occasionally flooded. This deep, somewhat poorly drained, nearly level soil is on the Poteau River flood plain. This soil is subject to occasional flooding. Slopes are smooth and dominantly less than 1 percent but range from 0 to 2 percent. Areas are 5 to 500 acres.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil extends to a depth of about 67 inches. The upper part is dark grayish brown silty clay loam, the middle part is very dark grayish brown silty clay, and the lower part is dark brown silty clay. The underlying material is dark reddish brown silty clay.

This soil is medium in natural fertility and organic matter content. Permeability is very slow, and the available water capacity is high. The high water table is 1/2 foot to 2 feet below the surface during winter and spring; flooding for very brief periods occurs at this time. The clayey subsoil restricts the downward movement of water, causing the upper part of the soil to remain wet for extended periods.

Included in mapping are small areas of Cupco soils in slightly concave areas. The included soils make up about 5 to 10 percent of this map unit. Individual areas generally are less than 1 acre.

Most of the acreage is used for pasture; a few acres are used for small grains and grain sorghum. This soil has medium potential for bermudagrass, fescue, and cultivated crops. Excess surface water limits cultivating and harvesting of crops at certain times of the year. Field drainage ditches help remove excess surface water, but they do not eliminate internal wetness.

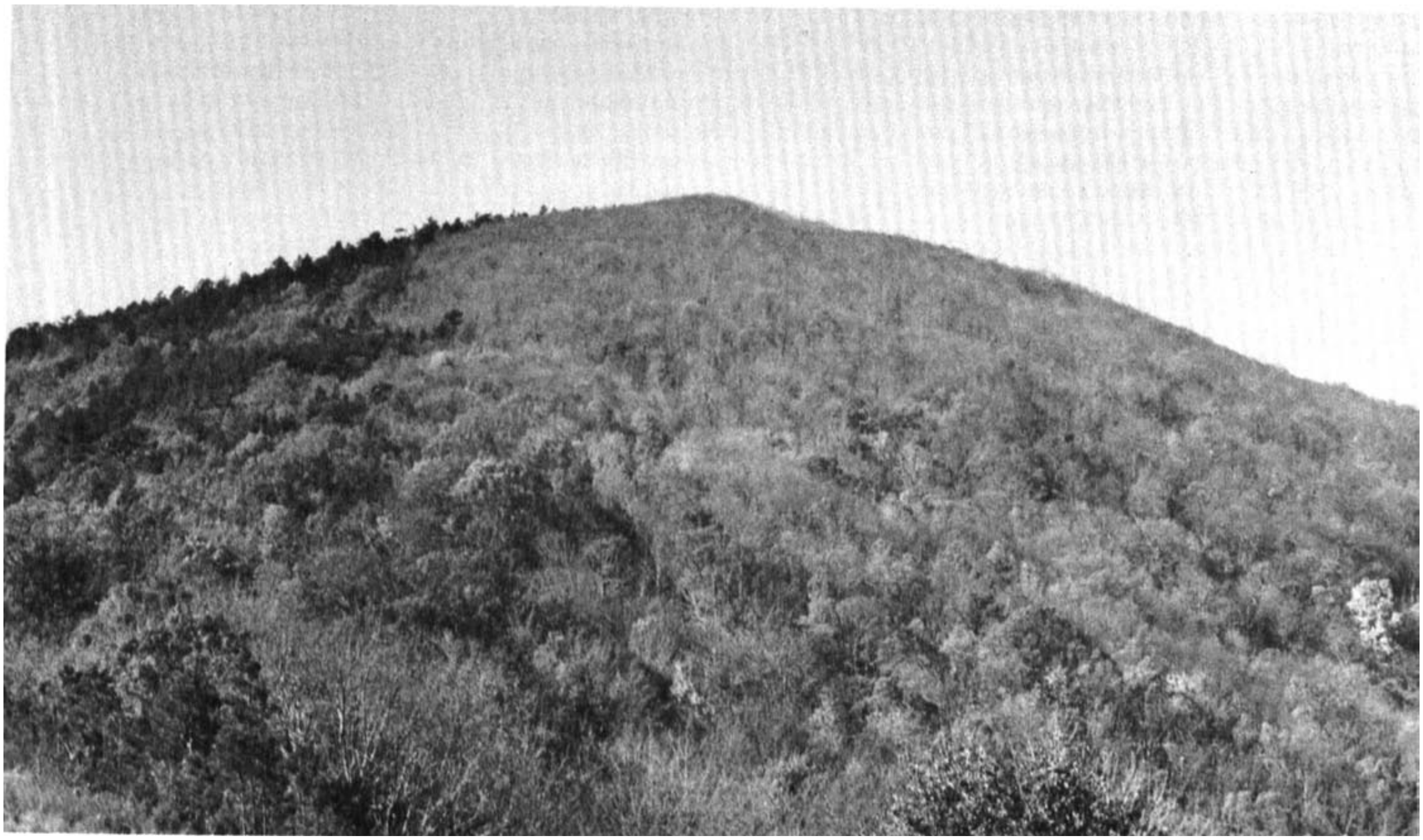


Figure 5.—On the south-facing slope, in an area of Pirum-Octavia-Panama association, steep, shortleaf pine is the dominant woodland species. On the north-facing slope, in an area of Pirum-Carnasaw-Caston complex, cool, 35 to 60 percent slopes, northern red oak and white oak are dominant.

Floodwaters occasionally damage crops and fences. Returning crop residue to the soil helps maintain good tilth and increases water intake. Cultivated crops and pastures respond to fertilizer.

Potential is medium for woodland. Common trees are post oak, hackberry, bur oak, willow oak, and cedar elm. If this soil is used for commercial production of timber, grazing of livestock is not recommended.

Because of seasonal wetness, flooding, very slow permeability, and the high shrink-swell potential, this soil has low potential for most urban and recreational uses.

The potential of this soil for use as habitat for wildlife is high.

This Pocola soil is in capability subclass IIIw and woodland suitability group 4w6; it is not assigned to a range site.

55—Psamments, rarely flooded, undulating. Psamments are sandy soils that have been reworked in dredging the Arkansas River channel for navigation purposes. These soils are gently undulating to hummocky. They are subject to rare flooding. Slopes range from 1 to 12 percent. Areas are 30 to 300 acres.

Psamments are quite variable within a short distance. They are dominantly brown and light brown sand to a depth of 60 inches or more. The sand is coarse and medium, and in some places there are layers of gravelly coarse sand.

Psamments are low in natural fertility and organic matter content. Reaction is slightly acid to moderately alkaline, and the soils are calcareous. Permeability is rapid, drainage is excessive, and the available water capacity is low.

Most of the acreage is sparsely vegetated or barren. These soils are very droughty. They are not used for agricultural purposes. The potential is low for cultivated crops and pasture. Grasses to plant to help protect the soil from wind erosion and to provide habitat for wildlife

are puffsheath dropseed, witchgrass, crabgrass, and lovegrass.

The potential for woodland is low. Black locust is the best adapted species. Seedling mortality is high.

Because of rapid permeability, sandy texture, and flooding, these soils have low potential for most urban and recreation uses and as habitat for wildlife.

Psamments are in capability subclass VIIs; they are not assigned to a woodland suitability group or a range site.

56—Redport silty clay loam, rarely flooded. This deep, well drained, nearly level soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Slopes are less than 1 percent. Areas are 10 to 350 acres.

Typically, the surface layer is very dark gray silty clay loam in the upper part and very dark grayish brown silty clay loam in the lower part to about 30 inches. The subsoil extends to a depth of about 57 inches. The upper part of the subsoil is dark brown silty clay loam, and the lower part is reddish brown clay loam. The underlying material is reddish brown sandy clay loam to about 65 inches.

This soil is high in natural fertility and organic matter content. It is neutral to moderately alkaline in the surface layer and neutral in the subsoil and underlying material. Permeability is moderate, and the available water capacity is high.

Included in mapping are a few intermingled areas of Garton silty clay loam. The included soils make up about 10 percent of the map unit. Individual areas generally are less than 3 acres.

Most of this soil is used for cultivated crops. It has high potential for row crops, small grains, and alfalfa. Returning crop residue to the soil helps maintain good tilth. The hazard of erosion is slight. Crops respond to fertilizer, but lime is not needed.

The potential is high for hay and pasture. This soil has high potential for eastern cottonwood, pecan, and black walnut. There are no significant limitations for hay, pasture, or woodland use and management.

Because this soil is rarely flooded, it has low potential for most urban uses and for camp areas. The potential is high for use as picnic areas and playgrounds.

This soil has high potential for use as habitat for wildlife. The number of wildlife present is dependent on the amount of food and cover available. In tilled areas, food and cover are limited.

This Redport soil is in capability class I and woodland suitability group 2o4; it is not assigned to a range site.

57—Rexor silt loam, occasionally flooded. This deep, well drained, nearly level to very gently sloping soil is on flood plains of local streams. This soil is subject to occasional flooding. Slopes are short and irregular and range from 0 to 3 percent but are generally less than 1 percent. Areas are 10 to 100 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is dark yellowish brown silty clay loam to a depth of about 65 inches. Mottles in shades of gray or brown are below a depth of 30 inches.

This soil is medium in natural fertility and organic matter content. It is medium acid to very strongly acid throughout except where the surface layer has been limed. Permeability is moderate, and the available water capacity is high. The soil has good tilth and can be worked within a wide range of moisture content.

Included in mapping are intermingled areas of Neff and Cupco soils that are in slight depressional areas. The included soils make up about 10 to 15 percent of the map unit. Individual areas generally are less than 1 acre.

Most of the acreage is used for pasture; some acreage is used for cultivated crops. This soil has medium potential for row crops and small grains. Potential is high for hay and pasture. Floodwater can damage crops and fences. Returning crop residue to the soil helps maintain good tilth. Pasture plants respond to fertilizer and lime.

This soil has high potential for shortleaf pine, loblolly pine, black walnut, and sweetgum. There are no significant limitations for woodland use and management. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Because this soil is occasionally flooded, it has low potential for most urban uses. It has low potential for use as camp areas, high potential for picnic areas, and medium potential for playgrounds.

The potential for use as habitat for wildlife is high.

This Rexor soil is in capability subclass IIw and in woodland suitability group 2o7; it is not assigned to a range site.

58—Roxana very fine sandy loam, rarely flooded. This deep, well drained, nearly level to gently undulating soil is on the Arkansas River flood plain. This soil is rarely flooded. Most areas of this soil have been mechanically smoothed, but some areas were not smoothed and remain gently undulating. Slopes dominantly are less than 1 percent but range to 3 percent along the short irregular slopes in undulating areas. Areas are 10 to 300 acres.

Typically, the surface layer is brown very fine sandy loam about 9 inches thick. The underlying material to a depth of about 62 inches is brown very fine sandy loam in the upper part, brown fine sandy loam in the middle part, and brown very fine sandy loam in the lower part.

This soil is high in natural fertility and medium in organic matter content. Reaction is slightly acid to moderately alkaline in the surface layer and neutral to

moderately alkaline in the underlying material. Permeability is moderate, and the available water capacity is high. The soil has good tilth and can be worked within a wide range of moisture content. In the undulating areas, concave surfaces remain wet slightly longer after a rain.

Included in mapping are soils, in the undulating areas, that are concave and have a dark brown silty clay loam subsoil. Also included are a few intermingled areas of Coushatta, Oklared, and Severn soils. The included soils make up about 10 to 15 percent of the map unit. Individual areas generally are less than 1 acre.

Most of the acreage is used for cultivated crops. This soil has high potential for row crops and small grains. Returning crop residue to the soil helps maintain good tilth. The hazard of erosion is slight. Crops respond to fertilizer, but lime seldom is needed.

The potential is high for hay and pasture. This soil also has high potential for eastern cottonwood, pecan, and black walnut. There are no significant limitations for pasture, hay, or woodland use and management. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Because this soil is rarely flooded, it has low potential for most urban uses and for camp areas. Potential is high for use as picnic areas and playgrounds.

This soil has high potential for use as habitat for wildlife. The number of wildlife present is dependent upon the food and cover present. In tilled areas, food and cover are limited.

The Roxana soil is in capability class I and woodland suitability group 2o4; it is not assigned to a range site.

59—Sallisaw loam, 1 to 3 percent slopes. This deep, well drained, very gently sloping soil is on stream terraces and alluvial fans. Slopes are smooth and convex. Areas are 5 to 350 acres.

Typically, the surface layer is reddish brown loam about 7 inches thick. The subsoil extends to a depth of about 62 inches. The upper part is red loam, the middle part is red clay loam, and the lower part is reddish yellow very gravelly clay loam.

This soil is medium in natural fertility and organic matter content. Reaction is acid throughout except in the surface layer in areas where lime has been added. Permeability is moderate, and the available water capacity is medium.

Included in mapping are soils, generally along drainageways, that have gray or grayish brown mottles at depths of 24 to 30 inches. Also included are small areas of Shermore and Stigler soils in swales. The included soils make up about 10 to 15 percent of the map unit. Areas are generally less than 3 acres.

Most of the acreage is used for pasture. This soil has medium potential for row crops and small grains. If row crops are grown, terracing and contour farming are needed to control water erosion. Returning crop residue to the soil helps maintain tilth and increase moisture intake.

The potential is medium for bermudagrass, tall fescue, and bahiagrass. Potential is high for hop clover and arrowleaf clover. Controlling brush and weeds helps maintain tame pasture. On hayland, weed control is accomplished by mowing. Pasture plants respond to fertilizer and lime.

This soil has medium potential for shortleaf pine, loblolly pine, and southern red oak. There are no significant limitations for woodland use and management.

This soil has high potential for many urban uses. Permeability is a moderate limitation for use of this soil as septic tank absorption fields or sewage lagoon areas.

The potential of this soil is high for most recreational uses.

This soil has high potential as habitat for bobwhite quail, mourning dove, cottontail rabbit, squirrel, and white-tailed deer. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

This Sallisaw soil is in capability subclass IIe and in woodland suitability group 3o7; it is not assigned to a range site.

60—Sallisaw loam, 3 to 5 percent slopes. This deep, well drained, gently sloping soil is on stream terraces and alluvial fans. Slopes are smooth and convex. Individual areas are 5 to 300 acres.

Typically, the surface layer is brown loam about 9 inches thick. The subsoil extends to a depth of about 60 inches. The upper part is reddish brown loam, the middle part is yellowish red clay loam, and the lower part is yellowish red very gravelly clay loam.

This soil is medium in natural fertility and organic matter content. Reaction is acid throughout except in the surface layer in areas where lime has been added. Permeability is moderate, and the available water capacity is medium.

Included in mapping are soils, generally along drainageways, that have gray or grayish brown mottles at depths of 24 to 30 inches. Also included are small areas where the gravelly layer is underlain by sandstone bedrock or by clay and shale at a depth of less than 60 inches. The included soils make up about 10 to 15 percent of this map unit. Individual areas generally are less than 3 acres.

Most of the acreage is used for pasture. This soil has low potential for row crops and medium potential for small grains. If cultivated crops are grown, terracing and contour farming are needed to help control erosion. Returning crop residue to the soil helps maintain tilth and increase moisture intake.

The potential is medium for bermudagrass, tall fescue, and bahiagrass. It is high for hop clover and arrowleaf clover. Control of brush and weeds is needed to help maintain tame pastures. On hayland, this is

accomplished by mowing. Pasture plants respond to fertilizer and lime.

This soil has medium potential for shortleaf pine, loblolly pine, and southern red oak. There are no significant limitations for woodland use and management.

This soil has high potential for many urban uses. Permeability is a moderate limitation for use of this soil as septic tank absorption fields or sewage lagoon areas.

The potential of this soil is high for most recreational uses.

This soil has high potential as habitat for bobwhite quail, mourning dove, cottontail rabbit, squirrel, and white-tailed deer. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

This Sallisaw soil is in capability subclass IIIe and woodland suitability group 3o7; it is not assigned to a range site.

61—Sallisaw loam, 2 to 5 percent slopes, eroded. This deep, well drained, very gently sloping to gently sloping soil is on stream terraces and alluvial fans. Slopes are smooth and convex. Areas are 5 to 300 acres.

Typically, the surface layer is reddish brown loam about 6 inches thick. The upper part of the subsoil is red sandy clay loam to about 30 inches and the lower part is yellowish red very gravelly sandy clay loam to about 60 inches.

Erosion has removed much of the surface layer and created rills and a few gullies. Thickness of the surface layer varies considerably within short distances. In about half of a mapped area, the surface layer is 1 inch to 6 inches thick and generally contains some subsoil material. In the rest of the area, the surface layer is not eroded in some places and is 6 to 9 inches thick. Generally the surface layer is thinnest near rills and gullies.

This soil is medium in natural fertility and low in organic matter content. Reaction is acid throughout except in the surface layer in areas where lime has been added. Permeability is moderate, and the available water capacity is medium.

Included in mapping are small areas of soils that have sandstone bedrock or clay and shale below the gravelly subsoil at a depth of less than 60 inches. Also included are soils, generally along drainageways, that have gray or grayish brown mottles at depths of 24 to 30 inches. The included soils make up about 10 to 15 percent of the map unit. Individual areas generally are less than 3 acres.

Most of the acreage is used for pasture. This soil has low potential for row crops and medium potential for small grains. Erosion has thinned the surface layer, thus reducing fertility, organic matter content, and productivity. If cultivated crops are grown, terracing and contour farming are needed to control erosion. Returning crop residue to the soil helps maintain tilth and increase moisture intake.

The potential is medium for bermudagrass and bahiagrass and low for tall fescue. The potential is high for hop clover and arrowleaf clover. Control of brush and weeds is needed to help maintain tame pastures. On hayland, this is accomplished by mowing. Crops and tame pastures respond to fertilizer and lime.

This soil has medium potential for shortleaf pine, loblolly pine, and southern red oak. There are no significant limitations for woodland use and management.

This soil has high potential for many urban uses. The moderate permeability is a limitation to the use of this soil as septic tank absorption fields or sewage lagoon areas.

Potential is high for most recreational uses.

This soil has high potential as habitat for bobwhite quail, mourning dove, cottontail rabbit, squirrel, and white-tailed deer. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

This Sallisaw soil is in capability subclass IIIe and woodland suitability group 3o7; it is not assigned to a range site.

62—Sallisaw stony loam, 3 to 15 percent slopes. This deep, well drained, very gently sloping to moderately steep, stony soil is on stream terraces and alluvial fans. In places, this soil is on narrow breaks or steps from one broad alluvial plain to another of different elevation. Areas are 5 to 350 acres.

Typically, the surface layer is dark grayish brown and brown stony loam about 5 inches thick. The subsoil extends to a depth of about 61 inches. The upper part is brown loam, the middle part is yellowish red clay loam, and the lower part is strong brown very gravelly clay loam.

This soil is medium in natural fertility and organic matter content. Reaction is acid throughout. Permeability is moderate, and the available water capacity is medium. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are small areas of soils that have sandstone bedrock or clay and shale below the gravelly subsoil at a depth of less than 60 inches. The included soils make up about 5 to 10 percent of this map unit. Individual areas generally are less than 3 acres.

This soil is primarily used as grazable woodland and as woodland. It has medium potential for shortleaf pine and loblolly pine. Sandstones on the surface hinder but do not prevent tree planting and harvesting. Erosion is a slight hazard. Revegetating unused logging roads helps control erosion.

This soil has low potential for cultivated crops and tame pasture. It has high potential for most urban uses

and medium potential for most recreational uses. The stoniness of the surface is the main limitation.

This soil has high potential as habitat for white-tailed deer, squirrel, cottontail rabbit, and turkey.

This Sallisaw soil is in capability subclass VIIs and in woodland suitability group 3x8; it is not assigned to a range site.

63—Severn very fine sandy loam, rarely flooded. This deep, well drained, nearly level to gently undulating soil is on the Arkansas River flood plain. This soil is subject to rare flooding. Most areas of this soil have been mechanically smoothed, but some areas were not smoothed and remain gently undulating. Slopes are dominantly less than 1 percent but range to 3 percent along the short irregular slopes in undulating areas. Areas are 10 to 250 acres.

Typically, the surface layer is dark brown very fine sandy loam about 9 inches thick. The underlying material extending to about 84 inches is brown very fine sandy loam that has thin layers of reddish brown silty clay and silt loam. In places thin layers of sand or clay are in the underlying material, especially in the lower part.

This soil is high in natural fertility and medium in organic matter content. This soil is neutral to moderately alkaline and calcareous in the surface layer, and it is calcareous and moderately alkaline in the underlying material. Permeability is moderately rapid, and the available water capacity is high. The soil has good tilth and can be worked within a wide range of moisture content. In the undulating areas, the concave surfaces are wet for slightly longer periods after rainfall.

Included in mapping are a few intermingled areas of Norwood, Oklared, and Roxana soils. The included soils make up about 10 to 15 percent of the map unit. Individual areas generally are less than 1 acre.

Most of the acreage is used for cultivated crops. This soil has high potential for row crops and small grains. Returning crop residue to the soil helps maintain tilth. The hazard of erosion is slight. Lime seldom is needed, but crops respond to fertilizer.

The potential is high for hay and pasture. This soil also has high potential for eastern cottonwood, pecan, and black walnut. There are no significant limitations for pasture, hay, or woodland use and management. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Because this soil is rarely flooded, it has low potential for most urban uses and for use as camp areas. The potential is high for use as picnic areas and playgrounds.

This soil has high potential for use as habitat for wildlife. The number of wildlife present is dependent on the amount of food and cover present. In tilled areas food and cover are limited.

The Severn soil is in capability class I and woodland suitability group 2o4; it is not assigned to a range site.

64—Sherless-Bengal complex, 3 to 15 percent slopes. This map unit consists of small areas of Sherless and Bengal soils that are so intermingled that they could not be separated at the scale selected for mapping. The soils are well drained, moderately deep, and moderately permeable and slowly permeable. These soils are on low-lying ridges in the valleys of the Ouachita Mountains in the southern third of the county. Areas range from 20 to 1,500 acres. Individual areas of each soil are 1/4 acre to 5 acres.

The moderately permeable Sherless gravelly fine sandy loam makes up about 50 percent of the map unit. Typically, the surface layer is very dark grayish brown gravelly fine sandy loam about 5 inches thick, and the subsurface layer is yellowish brown gravelly fine sandy loam about 6 inches thick. The subsoil extends to a depth of about 32 inches. The upper part of the subsoil is yellowish red gravelly clay loam, and the lower part is strong brown gravelly clay loam. The underlying material is fractured soft sandstone.

The Sherless soil is low in natural fertility and organic matter content. The surface layer is neutral to very strongly acid, and the subsoil is acid throughout. Permeability is moderate, and the available water capacity is low.

The slowly permeable Bengal loam makes up about 30 percent of the map unit. Typically, the surface layer is very dark grayish brown grading to brown loam about 8 inches thick. The subsoil extends to about 26 inches. The upper part of the subsoil is red clay, the middle part is yellowish red clay, and the lower part is dark grayish brown shaly clay that has red and strong brown mottles. The underlying material is gray and red soft shale.

Bengal soil is low in natural fertility and organic matter content. It is acid throughout. The available water capacity is medium.

Included in mapping are small areas of Sherless and Bengal soils that are stony or cobbly on the surface, small areas of Octavia soils on ridge crests, and small areas of soils that are fine sandy loam throughout and that are less than 20 inches thick over sandstone or shale. Also included are soils similar to Sherless and Bengal soils except that they are less than 20 inches thick over the underlying material. The included soils make up about 20 percent of the map unit. Individual areas generally are less than 2 acres.

Most of the acreage is used for tame pasture or woodland. These soils have medium potential for bermudagrass, arrowleaf clover, and hop clover. They have low potential for tall fescue and cultivated crops. Pasture plants respond to fertilizer and lime.

These soils have medium potential for shortleaf pine, loblolly pine, and white oak. There are no significant limitations for woodland use and management.

Sherless soil has medium potential for use for dwellings and local roads and streets. Bengal soil has low potential for most urban uses. Depth, slope, and

permeability are limitations for use of these soils as septic tank absorption fields, sewage lagoons, and trench type sanitary landfills.

The potential is medium for use of these soils as camp areas and picnic areas, and it is low for playgrounds.

These soils have high potential as habitat for bobwhite quail, mourning dove, turkey, cottontail rabbit, and white-tailed deer. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

These Sherless and Bengal soils are in capability subclass VIe and in woodland suitability group 3o1; they are not assigned to a range site.

65—Shermore fine sandy loam, 1 to 3 percent slopes. This deep, moderately well drained, very gently sloping soil is on foot slopes and alluvial fans. Slopes are smooth and range from concave to convex. Individual areas are 5 to 100 acres.

Typically, the surface layer is brown fine sandy loam about 8 inches thick. The subsoil extends to a depth of about 70 inches. The upper part of the subsoil is strong brown loam and sandy clay loam, the middle part is strong brown, mottled clay loam, and the lower part is coarsely mottled, red, yellowish brown, and gray clay loam.

This soil is medium in natural fertility and low in organic matter content. It is acid throughout except in the surface layer in areas where lime has been added. Permeability is moderately slow, and the available water capacity is medium. A fragipan at a depth of 20 to 40 inches restricts the downward movement of water and the growth of plant roots.

Included in mapping are small areas of Stigler and Vian soils. The included soils make up about 10 percent of the map unit. Individual areas generally are less than 2 acres.

Most of the acreage is used for pasture. This soil has medium potential for row crops and small grains. Terracing and contour farming are needed to help control erosion if cultivated crops are grown.

This soil has medium potential for hay and pasture. Control of brush and weeds is needed to maintain tame pastures. Pasture plants respond to fertilizer and lime.

The potential is medium for southern red oak, loblolly pine, and shortleaf pine. There are no significant woodland management problems.

Seasonal wetness is a severe limitation for use of this soil as septic tank absorption fields. The potential is medium for use for dwellings without basements, small commercial buildings, and most recreational uses.

This soil has high potential as habitat for wildlife.

This Shermore soil is in capability subclass IIe and in woodland suitability group 3o1; it is not assigned to a range site.

66—Shermore fine sandy loam, 3 to 5 percent slopes. This deep, moderately well drained, gently sloping soil is on foot slopes and alluvial fans. Slopes are smooth and concave. Areas are 5 to 100 acres.

Typically, the surface layer is brown fine sandy loam about 8 inches thick. The subsoil extends to a depth of about 65 inches. The upper part of the subsoil is strong brown loam and clay loam, the middle part is strong brown, mottled clay loam, and the lower part is coarsely mottled, yellowish red, gray, and red clay loam.

This soil is medium in natural fertility and low in organic matter content. It is acid throughout except where the surface has been limed. Permeability is moderately slow, and the available water capacity is medium. A fragipan at a depth of 20 to 40 inches restricts the downward movement of water and the growth of plant roots.

Included in mapping are small areas of Pirum and Bengal soils on upper slopes and small areas of Stigler soils on lower slopes. The included soils make up about 10 percent of the map unit. Individual areas generally are less than 2 acres.

Most of the acreage is used as pasture; some areas of this soil are used as woodland. This soil has low potential for row crops and small grains. Terracing and contour farming are needed to help control erosion if cultivated crops are grown.

This soil has medium potential for bermudagrass and low potential for tall fescue. Control of brush and weeds is needed to maintain tame pastures. Tame pasture plants respond to fertilizer and lime.

The potential is medium for southern red oak, loblolly pine, and shortleaf pine. There are no significant problems in woodland management.

Seasonal wetness is a severe limitation for use of this soil as septic tank absorption fields. The potential is medium for use for dwellings without basements, small commercial buildings, and most recreational uses.

This soil has high potential as habitat for wildlife.

This Shermore soil is in capability subclass IIIe and woodland suitability group 3o1; it is not assigned to a range site.

67—Shermore fine sandy loam, 2 to 5 percent slopes, eroded. This deep, moderately well drained, very gently sloping to gently sloping soil is on foot slopes and alluvial fans. Slopes are smooth and concave. Areas are 5 to 200 acres.

Typically, the surface layer is brown fine sandy loam about 7 inches thick. The subsoil extends to a depth of about 80 inches. The upper part of the subsoil is strong brown loam to about 31 inches, and the lower part is a fragipan that is coarsely mottled, strong brown, red, gray, and yellowish brown clay loam.

Erosion has thinned the surface layer and created rills and a few gullies. Thickness of the surface layer varies considerably within short distances. In about 50 percent of a mapped area, the surface layer is 1 inch to 6 inches thick and generally contains some subsoil material. In

the rest of the area, the surface layer is not eroded in places and is 6 to 8 inches thick. Generally, the surface layer is thinnest near rills and gullies.

This soil is low in natural fertility and organic matter content. It is acid throughout except where the surface has been limed. Permeability is moderately slow, and the available water capacity is medium. The fragipan at a depth of 20 to 40 inches restricts the downward movement of water and the growth of plant roots.

Included in mapping are small areas of Pirum and Bengal soils on upper slopes and small areas of Stigler soils on lower slopes. The included soils make up about 10 percent of the map unit. Individual areas generally are less than 2 acres.

Most of the acreage is used as pasture; some areas of this soil are used as woodland. This soil has low potential for row crops and small grains. Erosion has thinned the surface layer, thus reducing fertility, organic matter content, and productivity. Terracing and contour farming are needed to help control erosion if cultivated crops are grown.

This soil has medium potential for bermudagrass and low potential for tall fescue. Control of brush and weeds is needed to maintain good stands in tame pastures. Tame pasture plants respond to fertilizer and lime.

The potential is medium for southern red oak, loblolly pine, and shortleaf pine. There are no significant woodland management problems.

Seasonal wetness is a severe limitation for use of this soil as septic tank absorption fields. The potential is medium for dwellings without basements, small commercial buildings, and most recreational uses.

This soil has high potential as habitat for wildlife.

This Shermore soil is in capability subclass IIIe and in woodland suitability group 3o1; it is not assigned to a range site.

68—Shermore fine sandy loam, 2 to 8 percent slopes, gullied. This deep, moderately well drained, very gently sloping to sloping soil is on foot slopes and alluvial fans. Slopes are smooth and generally concave. Areas are 5 to 200 acres.

Typically, the surface layer is brown fine sandy loam about 4 inches thick. The subsoil extends to a depth of about 65 inches. The upper part of the subsoil is strong brown loam to about 17 inches, and the lower part is a fragipan that is coarsely mottled, strong brown, yellowish brown, red, and gray clay loam.

Erosion has thinned the surface layer and created rills and numerous gullies. Thickness of the surface layer ranges from 1 inch to 8 inches within short distances. Generally the surface layer is thinnest near rills and gullies. Gullies are 100 to 300 feet apart, 2 to 8 feet deep, and 3 to 20 feet wide.

This soil is low in natural fertility and organic matter content. It is acid throughout except where the surface has been limed. Permeability is moderately slow, and the available water capacity is medium. The fragipan at a depth of 15 to 40 inches restricts the downward movement of water and the growth of plant roots.

Included with this soil in mapping are small areas of Pirum and Bengal soils on upper slopes and small areas of Stigler soils on lower slopes. Because of similarity in soil properties and use, the eroded Kamie soils in the northeast part of the county were included in this map unit. The included soils make up about 15 percent of the map unit. Individual areas, other than those of Kamie soils, generally are less than 5 acres.

This soil has low potential for cultivated crops because of the numerous gullies. This limitation can be overcome only by extensive reshaping of gullies and constructing diversion ditches to intercept and remove excess runoff from higher lying areas.

Most of the acreage is used for pasture; some acreage is used for woodland. This soil has low potential for hay and pasture. Control of brush and weeds is needed to maintain tame pastures. Tame pasture plants respond to fertilizer and lime.

The potential is medium for southern red oak, loblolly pine, and shortleaf pine. Gullies are the main limitation to use of equipment in managing and harvesting the tree crop. There is a hazard of additional erosion.

This soil has medium potential for most urban and recreational uses. Seasonal wetness is a severe limitation for use of this soil as septic tank absorption fields.

This soil has medium potential as habitat for wildlife.

This Shermore soil is in capability subclass VIe and in woodland suitability group 4d3; it is not assigned to a range site.

69—Speer fine sandy loam, occasionally flooded. This deep, well drained, nearly level to very gently sloping soil is on flood plains of local streams. This soil is subject to occasional flooding. Slopes range from 0 to 2 percent but are mainly less than 1 percent. Areas are 10 to 250 acres.

Typically, the surface layer is dark brown fine sandy loam about 7 inches thick. The subsoil extends to about 52 inches. The upper part of the subsoil is brown loam, the middle part is yellowish red sandy clay loam, and the lower part is yellowish red loam. The underlying material is strong brown, mottled fine sandy loam to about 65 inches.

This soil is medium in natural fertility and organic matter content. The surface layer is strongly acid to neutral, and the subsoil is very strongly acid to medium acid. The underlying material is very strongly acid or strongly acid. Permeability is moderate, and the available water capacity is high. The soil has good tilth and can be worked within a wide range of moisture content.

Included in mapping are small areas of Kenn soils and small areas of soils that are cobbly on the surface. The included soils make up about 10 to 20 percent of the

map unit. Individual areas generally are less than 3 acres.

Most of the acreage is used as pasture; some areas of this soil are used as woodland. This soil has medium potential for row crops and small grains. Floodwaters cam damage crops and fences. Returning crop residue to the soil helps maintain good tilth. Crops respond to fertilizer and lime. Potential is high for improved bermudagrass and medium for tall fescue.

This soil has high potential for shortleaf pine, loblolly pine, black walnut, and southern red oak. There are no significant limitations for woodland use and management.

Because this soil is occasionally flooded, it has low potential for most urban uses. It has low potential for use as camp areas and high potential for playgrounds and picnic areas.

This soil has high potential as habitat for cottontail rabbit, squirrel, raccoon, turkey, beaver, and white-tailed deer. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

This Speer soil is in capability subclass IIw and in woodland suitability group 2o7; it is not assigned to a range site.

70—Speer-Neff association, occasionally flooded, undulating. This map unit consists of well drained Speer soils and moderately well drained Neff soils on the flood plains of local streams. These soils are subject to occasional flooding. The soils are on the landscape in a regular and repeating pattern of long, narrow swales and low-lying ridges that are parallel to, and a result of, movement of floodwaters. Each swale and each ridge commonly is 50 to 300 feet wide and 200 to 2,000 feet long. The ridges are 1 1/2 to 7 feet high and have short side slopes that range in gradient from 1 to 3 percent. The Speer soils are on ridges and side slopes, and the Neff soils are in swales. Areas range from 30 to 700 acres. Individual areas of each soil range from 1/2 acre to 15 acres.

The Speer soils make up about 50 percent of the map unit. Typically, the surface layer is dark grayish brown grading to dark yellowish brown fine sandy loam about 7 inches thick. The subsoil extends to a depth of about 46 inches. The upper part of the subsoil is brown loam, and the lower part is yellowish red clay loam. The underlying material is brown fine sandy loam to about 63 inches.

Speer soils are medium in natural fertility and organic matter content. Permeability is moderate. The available water capacity is high. The soils are acid throughout except where the surface has been limed.

The Neff soils make up about 30 percent of the map unit. Typically the surface layer is dark grayish brown loam about 10 inches thick. The subsoil extends to about 63 inches. The upper part of the subsoil is dark yellowish brown, mottled silt loam, the middle part is yellowish brown grading to pale brown, mottled silty clay loam, and the lower part is pale brown, mottled silt loam.

Neff soils are medium in natural fertility and organic matter content. They have moderately slow permeability and high available water capacity. They are acid throughout except where the surface has been limed. The soils are wet in winter and early in spring; this limits the cultivating and harvesting of some crops.

Included in mapping are a few areas in swales of the somewhat poorly drained Cupco soils. Also included are a few areas of soils that have a fine sandy loam subsoil and that are on ridges and in swales. The soils in swales are moderately well drained. The included soils make up about 20 percent of this map unit. Individual areas generally are less than 2 acres.

Most of the acreage is used for improved pasture; some acreage is used as woodland. Because these soils are occasionally flooded and the swales have seasonal wetness, the potential is medium for row crops and small grains. Floodwaters sometimes damage crops and fences. Returning crop residue to the soil helps maintain good tilth. Crops respond to fertilizer and lime.

The potential is medium for tall fescue and high for bermudagrass and for clovers in mixture. White clover is adapted to the swales, and arrowleaf, hop, and red clovers are adapted to the ridges. The dominant concerns in management are removing excess water from the swales and controlling brush and weeds in pastures.

Speer soils have high potential for loblolly pine, shortleaf pine, sweetgum, and southern red oak. Neff soils have medium potential for loblolly pine, shortleaf pine, and eastern cottonwood. In swales the use of equipment is restricted during wet seasons. If these soils are used for commercial production of timber, grazing by livestock is not recommended.

These soils have low potential for most urban uses. The main limitations are the occasional flooding and areas of seasonal wetness. The potential is low for use of these soils for camp areas and medium for most other recreational uses.

The soils have high potential as habitat for squirrel, cottontail rabbit, beaver, turkey, and white-tailed deer. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

These Speer and Neff soils are in capability subclass IIw and are not assigned to a range site. Speer soils are in woodland suitability group 2o7; Neff soils are in woodland suitability group 3w8.

71—Stigler silt loam, 0 to 1 percent slopes. This deep, moderately well drained, nearly level soil is on uplands. Areas are 10 to 500 acres.

Typically, the surface layer is dark grayish brown silt loam about 12 inches thick. The subsurface layer is brown silt loam about 11 inches thick. The subsoil extends to about 70 inches. The upper part is yellowish

brown, mottled silty clay, and the lower part is mottled, yellowish brown and light brownish gray silty clay.

This soil is medium in natural fertility and in organic matter content. It is acid except in the surface layer where lime has been added. In places the lower part of the subsoil ranges to mildly alkaline. Permeability is very slow, and the available water capacity is high. Wetness limits cultivating and harvesting in winter and spring.

Included in mapping are circular mounds that are 1 foot to 2 feet high and 30 to 100 feet in diameter. The mounds consist of soils similar to the Stigler soil except that the combined thickness of the surface and subsurface layers commonly is more than 30 inches. Also included are a few intermingled areas of Vian, Wing, and Wister soils. The included soils make up about 10 to 20 percent of the map unit. Individual areas generally are less than 5 acres.

Most of the acreage is used for tame pasture; some acreage is used for cultivated crops. This soil has high potential for tall fescue, bermudagrass, and white clover. Wetness in winter and spring is a limitation for cultivated crops and small grains. The dominant concern in management is removing excess surface water. In places, the moundy relief slows runoff. Where practical, crop rows should be so arranged that the furrows help drain ponded surface water. Returning crop residue to the soil helps improve tilth. Crops respond to fertilizer and lime.

The potential of this soil is high for native grass. Controlling growth of scrubby hardwoods, proper grazing, and preventing wildfires help maintain or improve the quantity and quality of native grasses.

Potential is low for woodland. Common trees are post oak and American elm. The use of equipment is restricted during wet seasons.

The seasonal wetness, very slow permeability, and the high shrink-swell potential are severe limitations for most urban and recreational uses.

This soil has high potential as habitat for wildlife.

This Stigler soil is in capability subclass IIw, in woodland suitability group 5o0, and in the Loamy Savannah range site.

72—Stigler silt loam, 1 to 3 percent slopes. This deep, moderately well drained, very gently sloping soil is on uplands. Slopes are smooth and generally concave. Areas are 5 to 1,000 acres.

Typically the surface layer is dark grayish brown silt loam about 10 inches thick. The subsurface layer is grayish brown silt loam about 12 inches thick. The subsoil extends to a depth of about 71 inches. The upper part is yellowish brown, mottled silty clay, and the lower part is mottled, yellowish brown and gray silty clay.

The soil is medium in natural fertility and in organic matter content. It is acid except in the surface layer where lime has been added. In places the lower part of the subsoil ranges to mildly alkaline. Permeability is very slow, and the available water capacity is high. Wetness limits cultivating and harvesting in winter and spring.

Included in mapping are circular mounds that are 1 foot to 2 feet high and 30 to 100 feet in diameter. The mounds consist of soils similar to the Stigler soil except that the combined thickness of the surface and subsurface layers commonly is more than 30 inches. Also included are a few intermingled areas of Vian, Wing, and Wister soils. The included soils make up about 10 to 20 percent of the map unit. Individual areas generally are less than 5 acres.

Most of the acreage is used for tame pasture (fig. 6); some acreage is used for cultivated crops. This soil has high potential for tall fescue, bermudagrass, and white clover. It has medium potential for cultivated crops and small grains. If row crops are grown, terracing and contour farming are needed to help control erosion. The mounded areas that are too irregular for terracing are better suited to tame pasture or sown crops. Returning crop residue to the soil helps control erosion. Crops respond to fertilizer and lime.

The potential is high for native grass. Controlling growth of scrubby hardwoods, proper grazing, and preventing wildfires helps maintain or improve the quantity and quality of native grasses.

The potential of this soil is low for woodland. Common trees are post oak and American elm. The use of equipment is restricted during wet seasons.

Seasonal wetness, the very slow permeability, and the high shrink-swell potential are severe limitations for most urban and recreational uses.

This soil has high potential as habitat for wildlife.

This Stigler soil is in capability subclass IIe, in woodland suitability group 5o0, and in the Loamy Savannah range site.

73—Stigler silt loam, terrace, 0 to 1 percent slopes. This deep, moderately well drained, nearly level soil is on high alluvial terraces. Slopes generally are smooth and concave. Areas are 10 to 500 acres.

Typically, the surface layer is brown silt loam about 10 inches thick, and the subsurface layer is light yellowish brown silt loam about 8 inches thick. The subsoil extends to a depth of 99 inches or more. The upper part of the subsoil is dark yellowish brown, mottled silty clay to about 41 inches, and the lower part is coarsely mottled, yellowish brown, light brownish gray, brownish yellow, and light gray silty clay.

This soil is medium in natural fertility and in organic matter content. It is acid throughout. Permeability is very slow, and the available water capacity is high. Wetness limits cultivating and harvesting in winter and early in spring.

Included in mapping is a soil on circular mounds that are 1 foot to 2 feet high and 30 to 100 feet in diameter. The soil is similar to the Stigler soil except that the combined thickness of its surface and subsurface layers

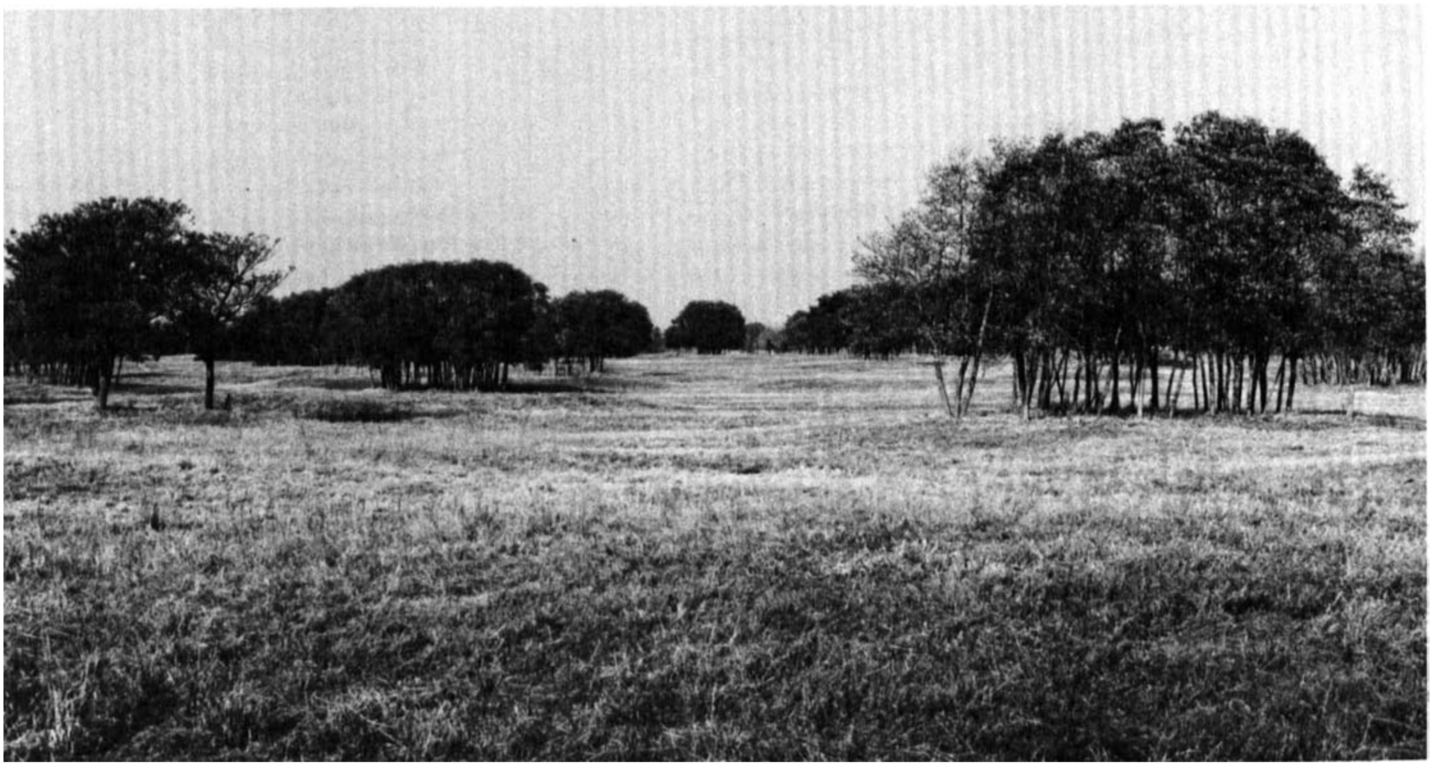


Figure 6.—Scattered mottes of trees on bermudagrass pasture on Stigler silt loam, 1 to 3 percent slopes.

is more than 30 inches. Also included are a few intermingled areas of Sallisaw and Shermore soils. The included soils make up about 10 to 20 percent of the map unit. Individual areas generally are less than 5 acres.

Most of the acreage is used as woodland and tame pasture; some acreage is used for cultivated crops. This soil has high potential for tall fescue, bermudagrass, and white clover. Wetness in winter and early in spring is the main limitation for cultivated crops and small grains. The dominant concern in management is removing excess surface water. In places, the moundy relief slows runoff. Where practical, crop rows should be arranged so that the furrows help to drain ponded surface water. Returning crop residue to the soil helps improve tilth. Crops respond to fertilizer and lime.

The potential of this soil is medium for woodland. Southern red oak, green ash, and water oak are the best adapted species. The use of equipment is restricted during wet seasons.

Seasonal wetness, the very slow permeability, and a high shrink-swell potential are severe limitations for most urban and recreational uses.

The potential of this soil as habitat for wildlife is high.

This Stigler soil is in capability subclass IIw and in woodland suitability group 3w5; it is not assigned to a range site.

74—Stigler silt loam, terrace, 1 to 3 percent slopes. This deep, moderately well drained, very gently sloping soil is on high alluvial terraces. Slopes generally are smooth and concave. Areas are 5 to 1,000 acres.

Typically, the surface layer is brown silt loam about 10 inches thick, and the subsurface layer is light yellowish brown silt loam about 8 inches thick. The upper part of the subsoil is dark yellowish brown, mottled silty clay to a depth of about 41 inches, and the lower part is coarsely mottled, yellowish brown, light brownish gray, brownish yellow, and light gray silty clay to about 99 inches.

This soil is medium in natural fertility and in organic matter content. It is acid throughout. Permeability is very slow, and the available water capacity is high. Wetness in winter and early in spring limits cultivating and harvesting.

Included in mapping is a soil on circular mounds that are 1 foot to 2 feet high and 30 to 100 feet in diameter. The soil is similar to the Stigler soil except that the combined thickness of its surface and subsurface layers is more than 30 inches. Also included are a few intermingled areas of Sallisaw and Shermore soils. The included soils make up about 10 to 20 percent of the map unit. Individual areas generally are less than 5 acres.

Most of the acreage is used as woodland and tame pasture; some acreage is used for cultivated crops. This soil has high potential for tall fescue, bermudagrass, and white clover. This soil has medium potential for cultivated crops and small grains. If row crops are grown, terracing and contour farming are needed to help control erosion. Mounded areas that are too irregular for terracing are better suited to sown crops, tame pasture, or woodland. Returning crop residue to the soil helps improve tilth. Crops respond to fertilizer and lime.

The potential of this soil is medium for woodland. Southern red oak, green ash, and water oak are the best adapted species. The use of equipment is restricted during wet seasons.

Seasonal wetness, the very slow permeability, and the high shrink-swell potential are severe limitations for most urban and recreational uses.

The potential of this soil as habitat for wildlife is high.

This Stigler soil is in capability subclass IIe and in woodland suitability group 3w5; it is not assigned to a range site.

75—Tuskahoma loam, 3 to 10 percent slopes. This shallow, moderately well drained, very gently sloping to strongly sloping soil is on low ridges primarily in the broad valleys in the southern part of the county. Slopes are smooth and convex. Areas are 10 to 250 acres.

Typically, the surface layer is dark grayish brown loam about 5 inches thick. The subsoil extends to a depth of about 16 inches. The upper part of the subsoil is grayish brown, mottled clay, and the lower part is dark grayish brown, mottled shaly clay. The underlying material is soft gray shale.

This soil is low in natural fertility and in organic matter content. The surface layer and lower part of the subsoil are medium acid to mildly alkaline, and the upper part of the subsoil is strongly acid to neutral. Permeability is very slow, and the available water capacity is low. The rooting zone is shallow. This soil is very droughty during the summer months.

Included in mapping are intermingled areas of loamy soils that are 7 to 12 inches thick and are underlain by soft sandstone bedrock. Also included are intermingled areas of soils that have a loamy surface layer and a clay loam subsoil; sandstone bedrock is at a depth of 10 to 25 inches. The included soils make up 25 percent of the map unit. Individual areas are less than 3 acres.

This soil is used as rangeland or pasture. Because of its shallowness and droughtiness, this soil has low potential for rangeland, pasture, and cultivated crops. Grasses and legumes commonly grown are bermudagrass, bahiagrass, tall fescue, hop clover, and common and Kobe lespedezas. To maintain stands of tall fescue and legumes, fertility is kept at a medium to high level, and grazing of fescue is limited from late in June through August to prevent drought kill. Bermudagrass and bahiagrass also respond to fertilizer. Controlling weeds and brush reduces plant competition for moisture and nutrients.

The potential of this soil is low for native grass. Controlling brush, proper grazing, and preventing wildfires help maintain or improve the quantity and quality of native grasses.

This soil has low potential for woodland. Common trees are post oak, blackjack oak, elm, and redcedar.

Potential is low for most recreational uses and for most urban uses.

This soil has low potential for use as habitat for wildlife.

This Tuskahoma soil is in capability subclass VIe, in woodland suitability group 5d0, and in the Shallow Savannah range site.

76—Tuskahoma stony loam, 2 to 15 percent slopes. This shallow, moderately well drained, very gently sloping to moderately steep, stony soil is on low ridges primarily in the broad valleys in the southern part of the county. Slopes are smooth and convex. Areas are 10 to 500 acres.

Typically, the surface layer is dark grayish brown stony loam about 5 inches thick. The subsoil extends to a depth of about 15 inches. The upper part of the subsoil is motteled, brown clay, and the lower part is mottled, dark gray shaly clay. The underlying material is gray soft shale.

This soil is low in natural fertility and organic matter content. The surface layer and the lower part of the subsoil are medium acid to mildly alkaline, and the upper part of the subsoil is strongly acid to neutral. Permeability is very slow, and the available water capacity is low. The rooting zone is shallow. This soil is very droughty during the summer months.

Included in mapping are intermingled areas of stony loamy soils that are 7 to 12 inches thick and are underlain by soft sandstone bedrock. Also included are intermingled areas of soils that have a stony loam surface layer and a clay loam subsoil and have sandstone bedrock at a depth of 10 to 20 inches. The included soils make up about 10 to 20 percent of the map unit. Individual areas are less than 1 acre.

This soil is used primarily as rangeland (fig. 7). The range generally is in poor condition. Vegetation consists of an open to medium stand of winged elm, post oak, blackjack oak, and redcedar and an understory of native grasses and forbs. Concerns in management are controlling brush and weeds and controlling grazing to allow an increase in the quality and quantity of native grasses. Potential is low for pasture, native grass, and hay. Surface stoniness hinders seedbed preparation in establishing tame pasture grasses. Clovers such as little hop clover, common lespedeza, and Kobe lespedeza can be established without seedbed preparation. If clovers are sown, the plants respond especially to phosphate and potash.

Figure 7.—Stones and cobbles on Tuskahoma stony loam, 2 to 15 percent slopes, interfere with seedbed preparation and limit the use of the soil primarily to rangeland.

The stoniness, shallow depth, and clay subsoil are severe limitations for cultivated crops, woodland, recreational uses, and most urban uses.

This soil has low potential for use as habitat for wildlife.

This Tuskahoma soil is in capability subclass VIIs, in woodland suitability group 5x0, and in the Shallow Savannah range site.

77—Vian silt loam, 1 to 3 percent slopes. This deep, moderately well drained, very gently sloping soil is on uplands. Slopes are smooth and generally convex. Areas are 5 to 200 acres.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsurface layer is brown silt loam about 8 inches thick. The subsoil extends to a depth of about 65 inches. The upper part is yellowish brown silt loam, the middle part is yellowish brown, mottled silty clay loam, and the lower part is coarsely mottled, yellowish brown, red, and light brownish gray silty clay loam.

This soil is medium in natural fertility and high in organic matter content. It is acid throughout except where the surface has been limed. Permeability is moderately slow, and available water capacity is high. Wetness in winter and spring limits cultivating and harvesting.

Included in mapping is a soil on circular mounds that are 1 foot to 2 feet high and 30 to 100 feet in diameter. The soil is similar to the Vian soil except that the combined thickness of its surface and subsurface layers commonly is more than 30 inches. Also included are a few intermingled areas of Stigler and Wing soils. The included soils make up about 10 to 20 percent of the map unit. Individual areas generally are less than 5 acres.

Most of the acreage is used for tame pasture; some acreage is used for cultivated crops. This soil has medium potential for tall fescue, bermudagrass, white clover, cultivated crops, and small grains. If row crops are grown, terracing and contour farming are needed to help control erosion. The mounded areas that are too irregular for terracing are better suited to tame pasture or sown crops. Returning crop residue to the soil helps control erosion. Plants respond to fertilizer and lime.

The potential is high for native grass. Controlling brush, proper grazing, and preventing wildfires help maintain or improve the quantity and quality of native grasses.

The potential of this soil is low for woodland. Common trees are post oak, elm, and sassafras. The use of equipment is restricted during wet seasons.

The seasonal wetness and the high shrink-swell potential are moderate limitations for most urban and recreational uses.

The potential of this soil as habitat for wildlife is high.

This Vian soil is in capability subclass IIe, in woodland suitability group 5o0, and in the Loamy Savannah range site.

78—Vian silt loam, 3 to 5 percent slopes. This deep, moderately well drained, gently sloping soil is on uplands. Slopes are smooth and generally convex. Areas are 5 to 100 acres.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsurface layer is brown silt loam about 7 inches thick. The subsoil extends to a depth of 75 inches. The upper part of the subsoil is yellowish brown silt loam, the middle part is yellowish brown, mottled silty clay loam, and the lower part is coarsely mottled, yellowish brown, red, and gray silty clay loam.

This soil is medium in natural fertility and high in organic matter content. It is acid throughout except where the surface has been limed. Permeability is moderately slow, and the available water capacity is high.

Included in mapping is a soil on circular mounds that are 1 foot to 2 feet high and 30 to 100 feet in diameter. The soil is similar to the Vian soil except that the combined thickness of its surface and subsurface layers is more than 30 inches. Also included are a few intermingled areas of Cowton soils. The included soils make up 10 to 20 percent of the map unit. Individual areas generally are less than 5 acres.

Most of the acreage is used for tame pasture or native grass meadow; some acreage is used for cultivated crops. This soil has medium potential for tall fescue, bermudagrass, clovers, cultivated crops, and small grains. If row crops are grown, terracing and contour farming are needed to help control erosion. The mounded areas that are too irregular for terracing are better suited to tame pasture or sown crops. Returning crop residue to the soil helps control erosion. Crops respond to fertilizer and lime.

The potential of this soil is high for native grass. Controlling brush, proper grazing, and preventing wildfires helps maintain or improve the quantity and quality of native grasses.

The potential is low for woodland. Common trees are post oak, elm, and sassafras. The use of equipment is restricted during wet seasons.

Seasonal wetness and the shrink-swell potential are moderate limitations for dwellings without basements, small commercial buildings, and most recreational uses.

The potential of this soil as habitat for wildlife is high.

This Vian soil is in capability subclass IIIe, in woodland suitability group 5o0, and in the Loamy Savannah range site.

79—Wabbaseka silty clay, rarely flooded. This deep, moderately well drained, nearly level soil is on the Arkansas River flood plain. This soil is rarely flooded. Slopes are smooth to very gently undulating and generally are less than 1 percent but range from 0 to 2 percent. Areas are 20 to 160 acres.

Typically, the surface layer is very dark grayish brown silty clay about 6 inches thick. The subsoil is dark reddish brown silty clay to a depth of about 18 inches. The underlying material to a depth of about 61 inches is stratified, brown very fine sandy loam, silt loam, silty clay loam, and fine sandy loam.

This soil is high in natural fertility and organic matter content. It is neutral or mildly alkaline throughout. Permeability is very slow, and the available water capacity is high. Because the surface layer is clayey, the soil can be worked only within a narrow range of moisture content.

Included in mapping are small areas of Latanier soils in the swale areas on undulating landscapes. Also included are a few intermingled areas of Oklared and Severn soils. The included soils make up 10 to 15 percent of the map unit. Individual areas generally are less than 1 acre.

Most of the acreage is used for cultivated crops. This soil has high potential for row crops and small grains. Crops respond well to fertilizer, but lime generally is not needed. Returning crop residue to the soil helps maintain tilth. Erosion is a slight hazard. Potential is high for hay and pasture.

This soil has high potential for eastern cottonwood and American sycamore. The restricted drainage limits woodland management. If this soil is used for commercial production of timber, grazing by livestock is not recommended.

Flooding and the high shrink-swell potential in the surface layer are severe limitations for most urban and recreational uses.

This soil has high potential as habitat for wildlife. The amount of wildlife present is dependent upon available

food and cover. Food and cover are limited in tilled areas.

This Wabbaseka soil is in capability subclass IIw and in woodland suitability group 2w5; it is not assigned to a range site.

80—Wetsaw fine sandy loam, 1 to 3 percent slopes. This deep, moderately well drained, very gently sloping soil is on alluvial benches and stream terraces in valleys of the Ouachita Mountains. Slopes are smooth and generally concave. Areas are 10 to 400 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 6 inches thick. The subsurface layer is yellowish brown loam about 4 inches thick. The subsoil extends to a depth of about 65 inches. The upper part is strong brown clay loam; the middle part is mottled, gray, brownish yellow, and red very gravelly clay; and the lower part is mottled, yellowish brown, light gray, and red clay to about 65 inches.

This soil is medium in natural fertility and low in organic matter content. It is acid throughout except where the surface has been limed. Permeability is slow, and the available water capacity is high.

Included in mapping is a soil on circular mounds that are 1 foot to 3 feet high and 50 to 100 feet in diameter. The soil is similar to the Wetsaw soil except that the combined thickness of its surface and subsurface layers is as much as 30 inches. Also included are areas of Wetsaw soils that have cobbles and stones on the surface and small areas of Sallisaw soils. The included soils make up about 10 to 15 percent of the map unit. Individual areas generally are less than 3 acres.

Most of the acreage is used for tame pasture or as woodland. This soil has medium potential for row crops and small grains. Seasonal wetness limits cultivating and harvesting of crops. If row crops are grown, terracing and contour farming are needed to help control erosion. The mounded areas that are too irregular for terracing are better suited to tame pasture, woodland, or sown crops. Returning crop residue to the soil helps maintain tilth. This soil has medium potential for tall fescue, bermudagrass, and white clover. Pasture and crops respond to fertilizer and lime.

The potential of this soil is medium for shortleaf pine, loblolly pine, red oak, and sweetgum. The use of equipment is restricted during wet seasons.

This soil has medium potential for most urban uses. Seasonal wetness is a severe limitation for sanitary facilities and dwellings with basements. Potential of this soil is medium for most recreational uses.

The potential as habitat for wildlife is high.

This Wetsaw soil is in capability subclass IIe and in woodland suitability group 3o1; it is not assigned to a range site.

81—Wetsaw fine sandy loam, 3 to 5 percent slopes. This deep, moderately well drained, gently sloping soil is on alluvial benches and stream terraces in valleys of the Ouachita Mountains. Slopes are smooth and generally concave. Areas are 10 to 100 acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is yellowish brown fine sandy loam about 3 inches thick. The subsoil extends to a depth of about 62 inches. The upper part is strong brown sandy clay loam, and the lower part is mottled, yellowish brown, light gray, and red gravelly clay loam.

This soil is medium in natural fertility and low in organic matter content. It is acid throughout except where the surface has been limed. Permeability is slow, and the available water capacity is high.

Included in mapping is a soil on circular mounds that are 1 foot to 3 feet high and 50 to 100 feet in diameter. The soil is similar to the Wetsaw soil except that the combined thickness of its surface and subsurface layers is as much as 30 inches. Also included are areas of Wetsaw soils that have cobbles and stones on the surface and small areas of Sallisaw soils. The included soils make up about 10 to 15 percent of this map unit. Individual areas generally are less than 3 acres.

Most of the acreage is used for tame pasture or as woodland. This soil has low potential for row crops and small grains. Seasonal wetness limits cultivating and harvesting of crops. If row crops are grown, terracing and contour farming are needed to help control erosion. The mounded areas that are too irregular for terracing are better suited to tame pasture, woodland, or sown crops. Returning crop residue to the soil helps maintain tilth. This soil has medium potential for tall fescue, bermudagrass, and white clover. Pasture and crops respond to fertilizer and lime.

Potential is medium for shortleaf pine, loblolly pine, red oak, and sweetgum. The use of equipment is restricted during wet seasons.

This soil has medium potential for most urban uses. Seasonal wetness is a severe limitation for sanitary facilities and dwellings with basements. Potential is medium for most recreational uses.

This soil has high potential as habitat for wildlife.

This Wetsaw soil is in capability subclass IIIe and in woodland suitability group 3o1; it is not assigned to a range site.

82—Wing silt loam, 0 to 2 percent slopes. This deep, moderately well drained, nearly level to very gently sloping soil is on uplands. Slopes are smooth and concave. Areas are 5 to 200 acres.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil is dark yellowish brown grading to yellowish brown, mottled clay to about 56 inches. The underlying material is mottled, yellowish brown and gray clay to about 70 inches. The subsoil and the underlying material are high in exchangeable sodium.

This soil is low in natural fertility and organic matter content. It is acid in the surface layer, acid or neutral in the upper part of the subsoil, and acid to moderately alkaline in the lower part of the subsoil. Permeability is very slow, and the available water capacity is low. The surface tends to crust in many areas. Plant cover generally is sparse. Water erosion is a severe hazard.

Included in mapping is a soil on circular mounds 1 foot to 2 feet high and 30 to 100 feet in diameter. The soil is similar to this Wing soil except that the surface layer is thicker. Also included are intermingled areas of Stigler and Wister soils and areas of soils with characteristics that are intermediate between Stigler and Wister soils and the Wing soil. The included soils make up about 10 to 25 percent of this map unit. Individual areas are generally less than 5 acres.

Most of the acreage is used for unimproved pasture; some acreage is in tame pasture. This soil has low potential for all common agricultural uses; however, the best use is bermudagrass pasture. Bermudagrass responds to fertilizer.

Because of the highly dispersible nature of this soil, it should not be used as earthen construction material. The potential is low for most urban and recreational uses.

This soil has low potential as habitat for wildlife. Adequate food and cover generally are not available for wildlife.

This Wing soil is in capability subclass VIs and in the Slickspot range site. It is not assigned to a woodland suitability group.

83—Wister silt loam, 0 to 1 percent slopes. This deep, moderately well drained, nearly level soil is in broad valleys, mainly in the northern half of the county. Slopes are slightly concave. Areas of this soil are 10 to 300 acres.

Typically, the surface and subsurface layers are brown silt loam about 15 inches thick. The subsoil extends to a depth of 53 inches. The upper part of the subsoil is dark yellowish brown, mottled silty clay, and the lower part is mottled, yellowish brown and gray silty clay. The underlying material is soft gray shale.

This soil is medium in natural fertility and high in organic matter content. It commonly is acid throughout, but in places the lower part of the subsoil is neutral to moderately alkaline. In places, lime has been added to the surface layer. Permeability is very slow, and the available water capacity is high. Wetness in winter and spring limits cultivating and harvesting.

Included in mapping are intermingled areas of Stigler soils and soils on circular mounds 1 foot to 2 feet high and 30 to 100 feet in diameter that are similar to the Wister soil except that they have a surface layer that is more than 30 inches thick and have shale at a depth of more than 60 inches. Also included, near small streams, are areas of Wing soils and, in adjacent areas, soils that are similar to Wing soils except that they have less than 15 percent sodium. The included soils make up 15 to 25 percent of this map unit. Individual areas generally are less than 3 acres.

Most of the acreage is used for tame pasture or native grass hay meadows; some acreage is used for cultivated crops. This soil has medium potential for tall fescue, bermudagrass, and white clover. The potential is medium for cultivated crops and small grain. Wetness in the winter and spring is the main limitation. The dominant concern in management is removing the excess surface water. In some areas, the moundy relief slows runoff. Where practical, crop rows should be arranged so that the furrows help drain excess surface water. Returning crop residue to the soil helps increase water intake. Crops respond to fertilizer and lime.

The potential of this soil is low for woodland. Common trees on this soil are post oak, winged elm, and eastern redcedar. The potential is high for native grass. Controlling brush, proper grazing, and preventing wildfires help maintain or improve the quantity and quality of native grass.

Seasonal wetness, the very slow permeability, and the high shrink-swell potential in the subsoil are the main limitations for most urban uses. This soil has low potential for most urban uses and as camp areas, playgrounds, and picnic areas.

This soil has high potential as habitat for bobwhite quail, mourning dove, cottontail rabbit, and white-tailed deer. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

This Wister soil is in capability subclass IIw, in woodland suitability group 5o0, and in the Loamy Savannah range site.

84—Wister silt loam, 1 to 3 percent slopes. This deep, moderately well drained, very gently sloping soil is in the Kiamichi River valley and in valleys in the northern half of the county. Slopes generally are concave. Areas are 10 to 800 acres.

Typically, the surface and subsurface layers are brown silt loam about 14 inches thick. The upper part of the subsoil is brown, mottled silty clay to about 28 inches, and the lower part is mottled, yellowish brown and gray silty clay to about 43 inches. The underlying material is gray and yellowish brown soft shale to about 50 inches.

This soil is medium in natural fertility and high in organic matter content. It commonly is acid throughout, but in places the lower part of the subsoil is neutral or moderately alkaline. In some areas, the surface layer has been limed. Permeability is very slow, and the available water capacity is high. Wetness in winter and spring limits cultivating and harvesting.

Included in mapping are intermingled areas of Stigler soils and soils on circular mounds 1 foot to 2 feet high and 30 to 100 feet in diameter. The soils on the mounds are similar to the Wister soil except that they have a

surface layer that is more than 30 inches thick and have shale at a depth of more than 60 inches. Also included are areas of Wing soils near small streams and, in adjacent areas, soils that are similar to Wing soils, but they have less than 15 percent sodium. The included soils make up 15 to 25 percent of this map unit. Individual areas are generally less than 3 acres.

Most of the acreage is used for tame pasture or native grass hay meadows; some acreage is used for cultivated crops and small grains. Potential is medium for cultivated crops, tall fescue, bermudagrass, and white clover. If row crops are grown, terracing and contour farming are needed to help control erosion. The mounded areas that are too irregular for terracing are better suited to tame pasture or sown crops. Cultivation and harvesting should be timed, if possible, so that they are not carried out during periods of seasonal wetness. Returning crop residue to the soil helps increase water intake. Crops respond to fertilizer and lime.

The potential of this soil is low for woodland. Common trees on this soil are post oak, winged elm, and eastern redcedar. Potential is high for native grass. Controlling brush, proper grazing, and preventing wildfires help maintain or improve the quantity and quality of native grass.

Seasonal wetness, the very slow permeability, and the high shrink-swell potential in the subsoil are the main limitations for most urban uses. This soil has low potential for use as urban areas, camp areas, playgrounds, and picnic areas.

This soil has high potential as habitat for bobwhite quail, mourning dove, cottontail rabbit, and white-tailed deer. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

This Wister soil is in capability subclass IIe, in woodland suitability group 5o0, and in the Loamy Savannah range site.

85—Wister silt loam, 3 to 5 percent slopes. This deep, moderately well drained, gently sloping soil is in the Kiamichi River Valley and in valleys in the northern half of the county. Slopes generally are concave. Areas are 10 to 300 acres.

Typically, the surface layer is dark grayish brown silt loam about 11 inches thick. The subsurface layer is light yellowish brown silt loam about 9 inches thick. The subsoil extends to a depth of about 53 inches. The upper part of the subsoil is yellowish brown, mottled silty clay, and the lower part of the subsoil is mottled, yellowish brown and light gray silty clay. The underlying material is gray soft shale.

This soil is medium in natural fertility and high in organic matter content. It is acid throughout except where the surface has been limed. In places the lower part of the subsoil is neutral or moderately alkaline. Permeability is very slow, and the available water capacity is high. Wetness in winter and spring limits cultivating and harvesting.

Included in mapping are intermingled areas of Stigler soils and soils on circular mounds 1 foot to 2 feet high and 30 to 100 feet in diameter. The soils on the mounds are similar to the Wister soil except that they have a surface layer more than 30 inches thick and have shale at a depth of more than 60 inches. Also included are areas of Wing soils near small streams and, in adjacent areas, soils that are gradational to Wing soils but have less than 15 percent sodium. The included soils make up 15 to 25 percent of this map unit. Individual areas generally are less than 3 acres.

Most of the acreage is used for tame pasture or native grass hay meadow; some acreage is used for cultivated crops. This soil has low potential for cultivated crops and small grains. Potential is medium for tall fescue, bermudagrass, and white clover. If row crops are grown, terracing and contour farming are needed to help control erosion. The mounded areas that are too irregular for terracing are better suited to tame pasture or sown crops. Cultivating and harvesting should be timed, whenever possible, so as not to fall within periods of seasonal wetness. Returning crop residue to the soil helps increase water intake and improve soil tilth. Crops respond to fertilizer and lime.

The potential of this soil is low for woodland. Common trees on this soil are post oak, winged elm, and eastern redcedar. The potential is high for native grass. Controlling brush, proper grazing, and preventing wildfires help maintain or improve the quantity and quality of native grass.

Seasonal wetness, the very slow permeability, low strength, and the high shrink-swell potential in the subsoil are the main limitations for most urban uses. This soil has low potential for urban uses, camp areas, playground, and picnic areas.

This soil has high potential as habitat for bobwhite quail, mourning dove, cottontail rabbit, and white-tailed deer. Adequate food and cover are essential if good numbers of wildlife are to be maintained.

This Wister soil is in capability subclass IIIe, in woodland suitability group 5o0, and in the Loamy Savannah range site.

Prime farmland

In this section, prime farmland is defined and discussed, and the prime farmland soils in LeFlore County are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the wise use of our nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. The moisture supply, of course, must be adequate, and the growing season has to be sufficiently long. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources, and farming these soils results in the least damage to the environment.

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They either are used for producing food or fiber or are available for these uses. Urban or built-up land and water areas cannot be considered prime farmland. Urban or built-up land is defined as any contiguous unit of land 10 acres or more in size that is used for nonfarm uses including housing, industrial sites, commercial sites, institutional sites, public building sites, railroad yards, small parks, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, and water control structures.

Prime farmland soils usually get an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable, and the acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not subject to frequent flooding during the growing season. The slope ranges mainly from 0 to 5 percent. For more detailed information on the criteria for prime farmland consult the local staff of the Soil Conservation Service.

About 264,470 acres in LeFlore County, or about 26 percent of the county, meet the requirements for prime farmland. The areas of prime farmland are scattered throughout the county, but most are in the northern part, mainly in map units 1, 2, 6, and 8 on the general soil map. Approximately 40,000 acres of the prime farmland is used for cultivated crops, mainly alfalfa, wheat, and soybeans.

A recent trend in land use in some parts of the county has been the conversion of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are wet, more erodible, droughty, or difficult to cultivate and less productive than prime farmland.

The following map units, or soils, make up prime farmland in LeFlore County. Soils that have a high water table or are subject to flooding qualify as prime farmland if drainage or flood control measures are used. Onsite investigation is necessary to determine that limitations or hazards have been overcome by corrective measures.

17— Coushatta silt loam, rarely flooded, 0 to 1 percent slopes
18— Coushatta silt loam, rarely flooded, undulating
19— Coushatta silty clay loam, rarely flooded, undulating
20— Coushatta loamy fine sand, overwash, rarely flooded
25— Garton silty clay loam, rarely flooded
32— Latanier silty clay, rarely flooded
33— Lela very fine sandy loam, overwash, rarely flooded
34— Lela silty clay, rarely flooded, 0 to 1 percent slopes
35— Lela silty clay, rarely flooded, 1 to 3 percent slopes
36— Lynnville Variant silty clay, occasionally flooded (where adequately drained)
37— McKamie loam, 3 to 5 percent slopes
39— Moreland silty clay, rarely flooded
40— Moreland silty clay loam, rarely flooded
42— Neff silt loam, occasionally flooded
44— Norwood silty clay loam, rarely flooded, 0 to 1 percent slopes
45— Norwood silty clay loam, rarely flooded, undulating
46— Norwood loam, rarely flooded

49— Oklared fine sandy loam, rarely flooded
54— Pocola silt loam, occasionally flooded (where adequately drained)
56— Redport silty clay loam, rarely flooded
57— Rexor silt loam, occasionally flooded
58— Roxana very fine sandy loam, rarely flooded
59— Sallisaw loam, 1 to 3 percent slopes
60— Sallisaw loam, 3 to 5 percent slopes
63— Severn very fine sandy loam, rarely flooded
65— Shermore fine sandy loam, 1 to 3 percent slopes
66— Shermore fine sandy loam, 3 to 5 percent slopes
69— Speer fine sandy loam, occasionally flooded
70— Speer-Neff association, occasionally flooded, undulating
71— Stigler silt loam, 0 to 1 percent slopes
72— Stigler silt loam, 1 to 3 percent slopes
73— Stigler silt loam, terrace, 0 to 1 percent slopes
74— Stigler silt loam, terrace, 1 to 3 percent slopes
77— Vian silt loam, 1 to 3 percent slopes
78— Vian silt loam, 3 to 5 percent slopes
79— Wabbaseka silty clay, rarely flooded
80— Wetsaw fine sandy loam, 1 to 3 percent slopes
81— Wetsaw fine sandy loam, 3 to 5 percent slopes
83— Wister silt loam, 0 to 1 percent slopes
84— Wister silt loam, 1 to 3 percent slopes
85— Wister silt loam, 3 to 5 percent slopes

This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described in the section "Detailed soil map units."

Use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and pasture

Keith Vaughan, conservation agronomist, and Kenneth J. Ferguson, district conservationist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Crops

About 40,000 acres in LeFlore County are used for crops. Most of the cropland is on the Arkansas River bottom lands. However, small acreages of bottom lands along the Poteau River and small acreages of upland, primarily in the extreme northern part of the county, are used for crops.

Crops grown most extensively on soils on the bottom land are alfalfa, soybeans, and wheat. Spinach and field peas are also grown on small acreages. Soybeans is the crop commonly grown on uplands.

Because cultivated crops are grown primarily on nearly level soils on the bottom land, erosion control is not a major concern. In minor undulating areas that are cropped, erosion can be minimized by a cropping system that keeps a vegetative cover on the ground for extended periods. Crop residue returned to the soil increases infiltration and reduces runoff and erosion. If sloping soils on uplands are farmed, terracing and contour farming help minimize erosion.

Surface drainage is the major concern in management on many clayey soils on the bottom lands of the Arkansas River and on much of the acreage of loamy soils on the bottom land along the major local streams. Lateral ditches and field drainage ditches are used to remove excess surface water. On some well drained soils, ditches are needed to help drain pothole areas.

Crops grown on uplands respond to fertilizer and lime. Lime is not needed on soils on the Arkansas River bottom land, but it generally is needed on soils on the other bottom land in the survey area. Fertilizer generally increases yields on the soils on bottom land. Additions of lime and fertilizer should be based on current soil tests, the needs of the crop, and the expected level of yields. The Cooperative Extension Service and the Soil Conservation Service can assist in determining the kind and amount of fertilizer and lime to apply.

Tame pasture

About 15 percent of the acreage in LeFlore County is used for improved pasture, mainly a mixture of grasses and clovers (fig. 8). Pastureland is extensive in the northern half of the county and in the valleys in the southern part of the county.

The dominant warm-season grasses are bermudagrass and bahiagrass. Coastal and Midland bermudagrasses are best suited to the deep, well drained soils, and Greenfield bermudagrass is best adapted on the moderately well drained and somewhat poorly drained soils. Bahiagrass is commonly grown on shallow, well drained soils on uplands where seedbed preparation is limited by soil depth and surface stoniness. Only the winter-hardy varieties of bahiagrass are adapted to this area. On deep soils, bermudagrass that is fertilized above the maintenance level produces more forage than does bahiagrass.

Tall fescue is the dominant cool-season grass grown in the county. It generally is grown in combination with legumes or with either bermudagrass or bahiagrass. If properly managed, fescue is a good source of protein for livestock during winter and can reduce feed costs.

The forage legumes common in the county are hop and arrowleaf clovers on well drained soils, white Dutch and ladino clovers on moderately well drained to somewhat poorly drained soils, and Korean and Kobe lespedezas on all soils that are suitable for tame pasture.

Figure 8.—Fescue and ladino clover provide good pasture in an area of Shermore fine sandy loam, 1 to 3 percent slopes.

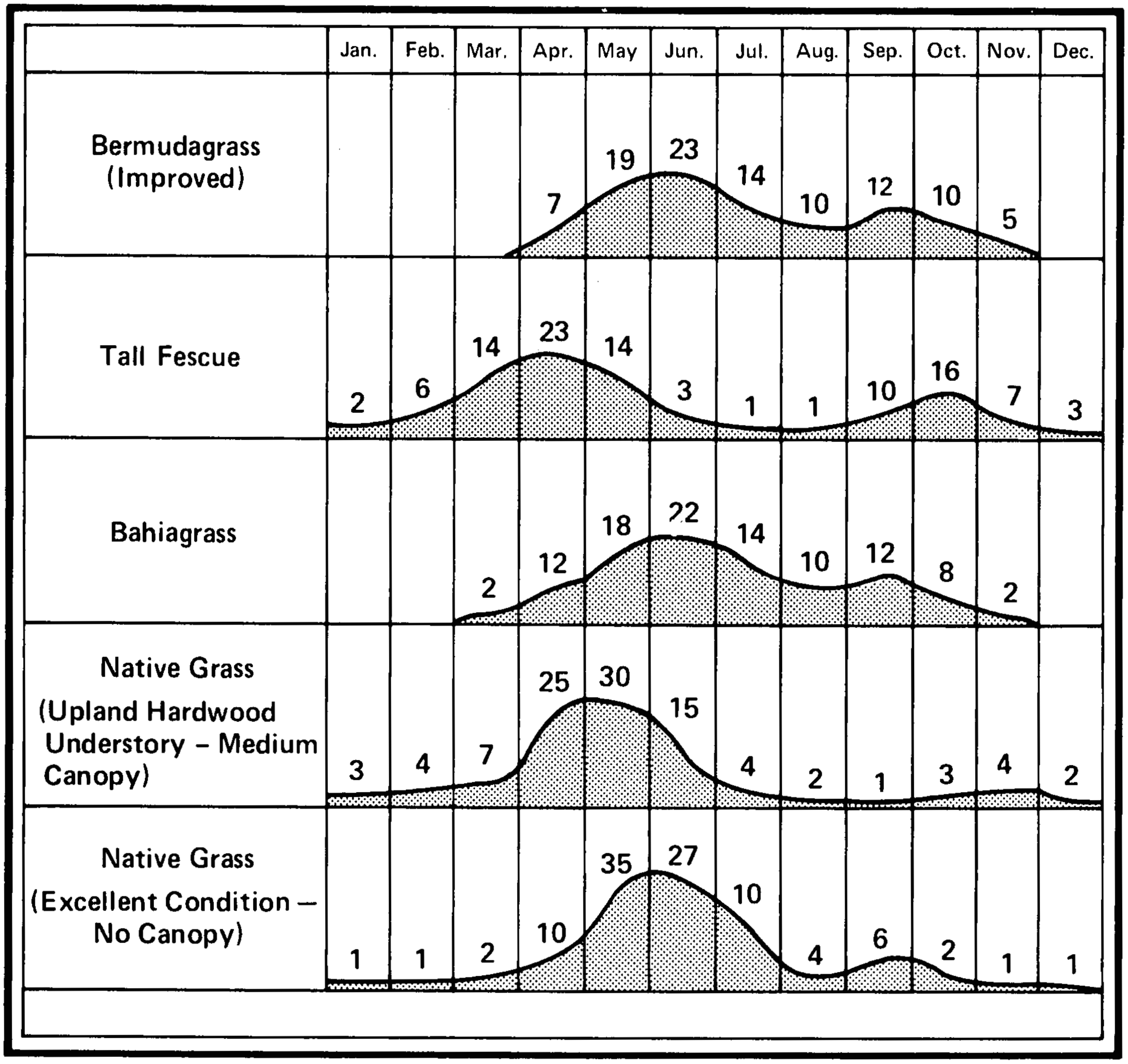


Figure 9.—Forage calendar showing monthly growth as a percentage of the forage produced annually.

Lime is needed on most soils except those on the Arkansas River bottom lands. Fertilizer is needed to establish stands, maintain plant vigor, and produce large amounts of forage.

A properly planned pasture program to furnish forage throughout the year includes adapted warm- and cool-season grasses and legumes. The percentage of growth, by month, for the dominant grasses is shown in figure 9. For example, bermudagrass produces 23 percent of its annual growth in June, and fescue produces 23 percent of its growth in April.

Soils vary in their capacity to produce forage. Some soils are shallow and have a low available water capacity; some soils are seasonally wet. Both of these conditions limit plant growth. Other soils that are well suited to pasture production are deep and well drained. The total yearly production of various pasture plants on each soil is given in animal unit months (AUM) in table 5. An animal unit month is the amount of forage required to feed one animal unit (one cow, one horse, five sheep or five goats) for 30 days. For example, an acre of improved bermudagrass on Sallisaw loam, 1 to 3 percent slopes, furnishes grazing for one animal unit for 7 months during the year.

Most soils used for pasture have adequate vegetative cover to prevent excessive erosion. Concerns in management are maintenance of a good stand of desirable adapted grasses and legumes, controlling brush and weeds, controlling grazing, and preventing wild fires. These practices help minimize erosion.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, animal manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at two levels: capability class and subclass. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have slight limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed soil map units."

Rangeland

Ernest C. Snook, range conservationist, Soil Conservation Service, helped prepare this section.

About 20 percent of LeFlore County is rangeland. Part of the area of range is open savannah, and the rest is covered with a mixture of trees that have an understory of grasses and forbs. The range commonly is used in

conjunction with tame pasture of clover, bermudagrass, and fescue.

The native vegetation in many parts of the county has been greatly depleted by continued excessive use. Much of the land area that was once open grassland is now covered with brush and weeds. The amount of forage produced may be less than half of that originally produced.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Table 6 shows, for each soil, the range site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. Only those soils that are used as rangeland or are suited to use as rangeland are listed. Explanation of the column headings in table 6 follows.

A *range site* is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, and proportion of range plants. The relationship between soils and vegetation was established during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants (fig. 10). Soil reaction, salt content, and a seasonal high water table are also important.

Figure 10.—Scrubby oak trees and native grasses on Clebit stony fine sandy loam, 10 to 30 percent slopes, which is in the Shallow Savannah range site. Rangeland is the best use of this soil.

Total production is the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals (fig. 11). It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Dry weight is the total annual yield per acre of air-dry vegetation. Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Characteristic vegetation—the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil—is listed by common name. Under *composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range condition. Range condition is determined by comparing

Figure 11.—Deciduous trees and medium and tall native grasses on Pirum soil in an area of Pirum-Clebit complex, 2 to 5 percent slopes. The range site is Sandy Savannah.

the present plant community with the potential natural plant community on a particular range site. The more closely the existing community resembles the potential community, the better the range condition. Range condition is an ecological rating only. It does not have a specific meaning that pertains to the present plant community in a given use.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, reduction of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Woodland management and productivity

Norman E. Smola, state staff forester, and Clifford W. Frick, area forester, Soil Conservation Service, helped prepare this section.

The land area of LeFlore County is about 60 percent covered by natural stands of commercial timber. Soils capable of supporting commercial species make up about 87 percent of the total area. The principal commercial species are loblolly pine and shortleaf pine (fig. 12). Southern red oak, white oak, ash, sweetgum, black walnut, cottonwood, hickory, pecan, sycamore, and water oak are harvested in lesser amounts.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, d, c, s, f, and r.

The third element in the symbol, an arabic numeral, indicates the kind of trees for which the soils in the group are best suited and also indicates the severity of the hazard or limitation. The numerals 1, 2, and 3 indicate slight, moderate, and severe limitations, respectively, and suitability for needleleaved trees. The numerals 4, 5, and 6 indicate slight, moderate, and severe limitations, respectively, and suitability for broadleaved trees. The numerals 7, 8, and 9 indicate slight, moderate, and severe limitations, respectively, and suitability for both needleleaved and broadleaved trees. The numeral 0 indicates that the soils are not suitable for the production of commercial wood products.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Figure 12.—Stand of native shortleaf pine on Speer fine sandy loam, occasionally flooded. This soil is well suited to use as woodland.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. Site index was determined at age 30 years for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production (fig. 13).

Woodland understory vegetation

Understory vegetation consists of grasses, forbs, shrubs, and other plants. Some woodland, if well managed, can produce enough understory vegetation to support grazing of livestock or wildlife, or both, without damage to the trees.

The quantity and quality of understory vegetation vary with the kind of soil, the age and kind of trees in the canopy, the density of the canopy, and the depth and condition of the litter. The density of the canopy determines the amount of light that understory plants receive.

Table 8 shows, for each soil suitable for woodland use, the potential for producing understory vegetation. The total production of understory vegetation includes the herbaceous plants and the leaves, twigs, and fruit of woody plants up to a height of 4 1/2 feet. It is expressed in pounds per acre of air-dry vegetation in favorable, normal, and unfavorable years. In a favorable year, soil moisture is above average during the optimum part of the growing season; in a normal year, soil moisture is average; and in an unfavorable year, it is below average.

Table 8 also lists the common names of the characteristic vegetation on each soil and the percentage composition, by air-dry weight, of each kind of plant. The table shows the kind and percentage of understory plants expected under a canopy density that is most nearly typical of woodland in which the production of wood crops is highest.

Recreation

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes

Figure 13.—Young loblolly pines 3 years after planting in a clear-cut area of Sherless-Bengal complex, 3 to 15 percent slopes.

and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife habitat

Billy M. Teels, biologist, Soil Conservation Service, helped prepare this section.

LeFlore County soils provide habitat for good populations of wildlife that are characteristic of eastern Oklahoma. The mixture of crops, range, forest, and pasture provides habitat diversity that is important to game such as dove, quail, and turkey, and furbearers such as beaver, skunk, coyote, deer, squirrel, raccoon, fox, opossum, and rabbit. Farm ponds and the large Robert S. Kerr and Wister Reservoirs provide good habitat for waterfowl during winter. Most farm ponds are stocked with bass and bluegill sunfish. Robert S. Kerr Reservoir provides a large fishery for white and striped bass, crappie, catfish, largemouth bass, and sunfish.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, and showy partridgepea.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, persimmon, beech, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, serviceberry, greenbrier, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and redcedar.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce

grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail rabbit, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, muskrat, mink, and beaver.

Engineering

Charles E. Bollinger, assistant state conservation engineer, and George D. Ensminger, area civil engineer, Soil Conservation Service, helped prepare this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building site development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary facilities

Table 12 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of

landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. Low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 20.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering index properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 20.

Fragments of rock larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The

estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and chemical properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and water features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in sloughs and potholes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-June, for example, means that flooding can occur during the period November through June.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil

boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Physical and chemical analyses of selected soils

The results of physical analysis of several representative pedons in the survey area are given in table 18 and the results of chemical analysis in table 19. The data are for soils sampled at carefully selected sites. The pedons of the Neff, Tuskahoma, Wetsaw, and Wing soils are typical of the series and are described in the section "Soil series and their morphology." Soil samples were analyzed by Oklahoma State University, Stillwater, and the National Soil Survey, Lincoln, Nebraska.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an oven-dry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods (*7*).

Sand—(0.05-2.0 mm fraction) weight percentages of materials less than 2 mm (3A1).

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all materials less than 2 mm (3A1).

Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of materials less than 2 mm (3A1).

Extractable cations—ammonium acetate pH 7.0, uncorrected; calcium (6N2), magnesium (6O2), sodium (6P2), potassium (6Q2).

Cation-exchange capacity—sum of cations (5A3a).

Organic matter—peroxide digestion (6A3).

Base saturation—sum of cations, TEA, pH 8.2 (5C3).

Reaction (pH)—1:1 water dilution (8C1a).

Total phosphorus—perchloric acid; colorimetry (6S1a).

Engineering index test data

Table 20 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are taxadjuncts to the named series; however, the soil behavior is the same as in the named series. The soil samples were tested by Oklahoma State Department of Transportation, Material Division.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Shrinkage—T 92 (AASHTO), D 427 (ASTM).

Classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*8*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 21 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning excessive development, plus *udult*, the suborder of the Ultisols that have a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is clayey, mixed, thermic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*6*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*8*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Bengal series

The Bengal series consists of moderately deep, well drained, slowly permeable soils that formed in colluvium and material that weathered from shale. These gently sloping to steep soils are on crests and side slopes of mountains and hills. Slopes range from 4 to 40 percent. Soils of the Bengal series are clayey, mixed, thermic Typic Hapludults.

Bengal soils are on the same landscape as Clebit, Octavia, Pirum, Sherless, Shermore, Tuskahoma, and Wetsaw soils. Clebit soils commonly are on ridgetops and are shallow over sandstone bedrock. Octavia soils

are on side slopes and foot slopes and have a fine-loamy control section. Pirum, Sherless, and Tuskahoma soils are intermingled with Bengal soils. Pirum and Sherless soils have a fine-loamy control section and have sandstone bedrock at a depth of more than 20 inches. Shermore soils are on foot slopes and have a fragipan. Tuskahoma soils have a clayey control section and have shale at a depth of 10 to 20 inches. Wetsaw soils are in lower positions and are underlain by a gravelly layer.

Typical pedon of Bengal stony fine sandy loam, in an area of Bengal-Clebit association, strongly sloping, in woodland, 2,900 feet north and 50 feet west of southeast corner of sec. 25, T. 8 N., R. 25 E.

A11—0 to 4 inches; dark brown (10YR 3/3) stony fine sandy loam; weak fine granular structure; very friable; sandstone gravel makes up 10 percent of the volume, sandstone cobbles make up 10 percent, and stones make up 5 percent; medium acid; gradual wavy boundary.

A12—4 to 7 inches; yellowish brown (10YR 5/4) stony fine sandy loam; weak fine granular structure; very friable; sandstone gravel makes up 10 percent of the volume, sandstone cobbles make up 10 percent, and stones make up 5 percent; strongly acid; gradual wavy boundary.

IIB21t—7 to 22 inches; yellowish red (5YR 5/6) clay; moderate fine blocky structure; firm; continuous clay films on faces of peds; few small fragments of shale; very strongly acid; gradual smooth boundary.

IIB22t—22 to 30 inches; yellowish red (5YR 5/6) clay; common fine distinct red mottles and few fine faint strong brown mottles; weak fine blocky structure; very firm; continuous clay films on faces of peds; small fragments of shale make up 5 percent of the volume; very strongly acid; gradual smooth boundary.

IIB3—30 to 36 inches; yellowish red (5YR 4/6) shaly clay; few fine distinct light brownish gray mottles; weak fine blocky structure; very firm; patchy clay films on faces of peds; small fragments of shale make up 30 percent of the volume; very strongly acid; clear irregular boundary.

IICr—36 to 50 inches; gray and yellowish brown soft shale.

Solum thickness ranges from 20 to 40 inches. Reaction is medium acid or strongly acid in the A11 horizon and strongly acid or very strongly acid in the A12 horizon, IIB2t horizon, and IIB3 horizon.

The A11 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The A horizon commonly is stony fine sandy loam, but it ranges to fine sandy loam, loam, or stony loam. Sandstone gravel in the A horizon ranges from 2 to 10 percent by volume. Sandstone cobbles range from 5 to 20 percent by volume. Stones make up 0 to 15 percent by volume in the A11 horizon. Stones cover 0 to 40 percent of the ground surface. The A12 horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6.

The IIB2t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. It is clay or silty clay. In some pedons there is a B21t horizon. It is stony clay loam 2 to 6 inches thick and has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. The clay content of the IIB2t horizon ranges from 40 to 60 percent. Sandstone gravel and fragments of shale range from 0 to 10 percent by volume. Fine very pale brown and brownish yellow mottles range from none to common. Fine or medium light gray mottles range from few to many in the IIB2t horizon. The gray mottles are inherited from the parent material and are not indicative of wetness.

The IIB3 horizon has hue of 5YR to 10YR, value of 4 to 7, and chroma of 1 to 6, or it is mottled in shades of red, brown, and gray. It is clay, silty clay, shaly clay, or shaly silty clay.

Soils that are similar to Bengal soils except that they have a solum 40 to 50 inches thick were considered Bengal soils in naming the map units. Their behavior is essentially like that of the Bengal soils.

Carnasaw series

The Carnasaw series consists of deep, well drained, slowly permeable soils that formed in material weathered from shale. These gently sloping to very steep soils are on ridge crests and side slopes of uplands. Slopes range from 4 to 60 percent. Soils of the Carnasaw series are clayey, mixed, thermic Typic Hapludults.

Carnasaw soils are on the same landscape as Caston, Clebit, Octavia, Panama, and Pirum soils. Caston, Clebit, and Panama soils have a loamy-skeletal control section. Caston and Panama soils are on colluvial benches and foot slopes, and Clebit soils commonly are on ridgetops and formed in material weathered from sandstone. Octavia and Pirum soils have a fine-loamy control section. Octavia soils are on colluvial benches and foot slopes, and Pirum soils are on ridgetops and side slopes.

Typical pedon of Carnasaw stony loam, 4 to 15 percent slopes, in woodland, 500 feet north and 700 feet west of the southeast corner, sec. 31, T. 4 N., R. 25 E.

A1—0 to 3 inches; brown (10YR 4/3) stony loam; weak fine granular structure; friable; sandstone gravel makes up 10 percent of the volume, sandstone cobbles make up 5 percent, and stones make up 5 percent; medium acid; clear wavy boundary.

A2—3 to 8 inches; brown (7.5YR 5/4) gravelly loam; weak fine granular structure; friable; sandstone gravel makes up 15 percent, sandstone cobbles make up 5 percent, and stones make up 3 percent; strongly acid; gradual wavy boundary.

B21t—8 to 12 inches; yellowish red (5YR 5/6) clay loam; moderate fine subangular blocky structure; friable; discontinuous clay films on faces of peds; sandstone gravel makes up 15 percent of the volume; very strongly acid; gradual wavy boundary.

B22t—12 to 32 inches; red (2.5YR 5/6) clay; few reddish yellow (7.5YR 6/6) mottles in lower 5 inches; moderate fine blocky structure; firm; nearly continuous clay films on faces of peds; sandstone gravel makes up 3 percent of the volume; very strongly acid; clear smooth boundary.

B23t—32 to 43 inches; red (2.5YR 5/6) clay; common to many fine distinct light gray (10YR 7/2) mottles; weak fine blocky structure; firm; nearly continuous clay films on faces of peds; sandstone gravel makes up 3 percent of the volume; very strongly acid; gradual smooth boundary.

B3—43 to 51 inches; mottled light gray (10YR 7/2), yellowish red (5YR 5/6), and red (2.5YR 4/6) shaly clay; weak fine blocky structure; firm; patchy clay films on faces of peds; small fragments of shale make up 20 percent of the volume; very strongly acid; clear irregular boundary.

Cr—51 to 60 inches; gray and yellowish brown soft shale that has few thin seams of gray clay; fractured and tilted.

Solum thickness and depth to shale bedrock range from 40 to 60 inches. Reaction is medium acid or strongly acid in the A horizon and strongly acid or very strongly acid in the B horizon. The surface cover of sandstone ranges from 3 to 40 percent. Stones range from 3 inches to more than 2 feet in diameter, but commonly they are 6 inches to 2 feet in diameter. In the A horizon, sandstone gravel makes up 2 to 30 percent of the volume, sandstone cobbles make up 0 to 25 percent, and stones make up 3 to 15 percent. Sandstone gravel or small fragments of shale in the B2t horizon make up 2 to 15 percent of the volume, and sandstone cobbles make up 0 to 5 percent. Small fragments of shale and sandstone gravel in the B3 horizon make up 15 to 40 percent of the volume, and sandstone cobbles make up 0 to 5 percent.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3; or it has hue of 7.5YR, value of 3 or 4 and chroma of 2. The A1 horizon dominantly is stony loam, but it ranges to stony silt loam and stony fine sandy loam.

The A2 horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 to 8, or value of 6 and chroma of 4; or it has hue of 10YR, value of 5 or 6, and chroma of 3. It dominantly is gravelly loam but ranges to gravelly silt loam, gravelly fine sandy loam, or their cobbly or stony counterparts.

The B21t horizon has hue of 5YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. It is silty clay loam, clay loam, or clay. The B22t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. Fine or medium mottles in shades of brown or yellow range from none to common. The B23t horizon is the same in color as the B22t horizon except that in some places it has common to many gray mottles, or it is coarsely mottled in shades of red, brown, and gray. Texture of the B22t and B23t horizons is silty clay or clay.

The B3 horizon has hue of 5YR, value of 4 or 5, and chroma of 6 or 8, or it has hue of 7.5YR, value of 5 or 6, and chroma of 6 or 8. In some pedons, this horizon is mottled in shades of red, brown, and gray. In some pedons that have a dominant matrix color, this horizon also has mottles in shades of red, brown, and gray. The B3 horizon is clay, silty clay, shaly clay, or shaly silty clay. The lower boundary of the B3 horizon is irregular, and soil material extends into the underlying rock at random intervals.

The Cr horizon is gray and olive shale that has interbedded layers of sandstone. The bedrock is tilted more than 20 degrees from horizontal.

Soils that are similar to Carnasaw soils except that they are 36 to 40 inches deep over sandstone bedrock, similar soils that have gray mottles, which are inherited from the parent material, in the upper 20 inches of the argillic horizon, and similar soils that are more than 60 inches deep over shale were considered Carnasaw soils in naming the map units. Their behavior is essentially like that of the Carnasaw soils.

Caston series

The Caston series consists of deep, well drained, moderately permeable, stony soils that formed in loamy colluvium. The colluvium is derived from material weathered from interbedded sandstone and shale. These soils are on colluvial benches and foot slopes in the Ouachita Mountains. Slopes range from 35 to 60 percent. Soils of the Caston series are loamy-skeletal, siliceous, thermic Typic Paleudults.

Caston soils are on the same landscape as Carnasaw, Octavia, Panama, and Pirum soils. Carnasaw and Pirum soils generally are on the upper part of slopes. Carnasaw soils have a clayey control section, and Pirum soils have a fine-loamy control section. Octavia and Panama soils are intermingled with Caston soils. Panama soils have clay within a depth of 60 inches, and Octavia soils have a fine-loamy control section.

Typical pedon of Caston stony fine sandy loam, in an area of Pirum-Carnasaw-Caston complex, cool, 35 to 60 percent slopes, in woodland, 950 feet north and 125 feet west of the southeast corner of sec. 20, T. 2 N., R. 24 E.

A1—0 to 4 inches; brown (10YR 4/3) stony fine sandy loam; weak fine granular structure; friable; fragments of sandstone make up 50 percent of the volume; medium acid; clear wavy boundary.

A2—4 to 10 inches; yellowish brown (10YR 5/4) very gravelly fine sandy loam; weak fine granular structure; friable; fragments of sandstone make up 40 percent of the volume; strongly acid; gradual wavy boundary.

B1—10 to 22 inches; strong brown (7.5YR 5/6) very gravelly fine sandy loam; weak fine granular structure; friable; fragments of sandstone make up 60 percent of the volume; very strongly acid; gradual wavy boundary.

B21t—22 to 52 inches; yellowish red (5YR 5/6) very gravelly clay loam; weak fine subangular blocky structure; friable; discontinuous clay films on faces of peds; fragments of sandstone make up 45 percent of the volume; very strongly acid; gradual wavy boundary.

B22t—52 to 80 inches; strong brown (7.5YR 5/6) very gravelly clay loam; few fine distinct brown (7.5YR 4/4) and pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable; discontinuous clay films on faces of peds; fragments of sandstone make up 50 percent of the volume; very strongly acid.

Solum thickness is more than 60 inches.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. Texture is gravelly loam, very gravelly loam, stony loam, gravelly fine sandy loam, very gravelly fine sandy loam, or stony fine sandy loam. Content of coarse fragments of sandstone ranges from 20 to 55 percent, by volume. Within this range about 20 to 45 percent is less than 76 millimeters in diameter and 0 to 10 percent is more than 76 millimeters in diameter. Reaction is strongly acid to neutral.

The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Texture, reaction, and content of coarse fragments of the A2 horizon are the same as those of the A1 horizon.

The B1 horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 2 to 6. Texture is gravelly loam, very gravelly loam, gravelly fine sandy loam, or very gravelly fine sandy loam. Content of coarse fragments of sandstone ranges from 25 to 70 percent, by volume. Within this range about 25 to 60 percent is less than 76 millimeters in diameter and 0 to 10 percent is more than 76 millimeters in diameter. Reaction is very strongly acid or strongly acid.

The B2t horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 6 to 8. Texture is very gravelly clay loam or very gravelly sandy clay loam. Content of coarse fragments of sandstone ranges from 40 to 70 percent, by volume. Within this range, about 40 to 60 percent is less than 76 millimeters in diameter and 0 to 10 percent is more than 76 millimeters in diameter. Reaction is very strongly acid.

Ceda series

The Ceda series consists of deep, well drained, rapidly permeable, cobbly soils that formed in alluvial material that weathered from interbedded sandstone and shale. These nearly level to very gently sloping soils are on flood plains. Slopes range from 0 to 2 percent. Soils of the Ceda series are loamy-skeletal, siliceous, nonacid, thermic Typic Udifluvents.

Ceda soils are associated with Kenn and Speer soils. Kenn soils are in a complex with Ceda soils, but they have less gravel and cobbles in the upper 30 inches of the solum. Speer soils commonly are downstream and further from the source of sediment, and they have a fine-loamy control section.

Typical pedon of Ceda cobbly loam, in an area of Kenn-Ceda complex, occasionally flooded, in a pasture about 3 miles northwest of Wister, 1,100 feet west and 1,300 feet north of the southeast corner of sec. 4, T. 6 N., R. 24 E.

A1—0 to 8 inches; brown (7.5YR 4/4) cobbly loam; weak fine granular structure; friable; sandstone gravel makes up 15 percent of the volume, and sandstone cobbles make up 20 percent; slightly acid; clear wavy boundary.

C1—8 to 28 inches; strong brown (7.5YR 5/6) cobbly clay loam; massive; friable; sandstone gravel makes up 30 percent of the volume, and sandstone cobbles make up 40 percent; medium acid; diffuse wavy boundary.

C2—28 to 65 inches; brown (7.5YR 4/4) cobbly clay loam; massive; friable; sandstone gravel makes up 40 percent of the volume, sandstone cobbles make up 40 percent, and stones make up 5 percent; slightly acid.

Reaction ranges from slightly acid to medium acid in all horizons. Surface cover of sandstone ranges from 0 to 40 percent.

The A1 horizon has hue of 7.5YR, value of 3 or 4, and chroma of 2 or 4; or it has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is loam, gravelly fine sandy loam, stony fine sandy loam, or fine sandy loam. Fragments of sandstone in the A1 horizon make up 15 to 50 percent of the volume. Sandstone gravel makes up 15 to 40 percent, sandstone cobbles make up 0 to 30 percent, and stones make up 0 to 10 percent.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. The fine earth fraction is loam, fine sandy loam, or clay loam. Total volume of fragments of sandstone in the C horizon is 35 to 85 percent. Sandstone gravel makes up 35 to 70 percent of the volume, sandstone cobbles make up 5 to 50 percent, and stones make up 0 to 15 percent.

Clebit series

The Clebit series consists of shallow, well drained, moderately rapidly permeable soils that formed in material weathered from sandstone. These gently sloping to very steep soils are on crests and side slopes of mountains and low ridges. Slopes range from 2 to 60 percent. Soils of the Clebit series are loamy-skeletal, siliceous, thermic Lithic Dystrochrepts.

Clebit soils are on the same landscape as Bengal, Carnasaw, and Pirum soils. Bengal, Carnasaw, and Pirum soils commonly are on side slopes. Bengal and Carnasaw soils have a clayey control section and a thicker solum. Pirum soils have a fine-loamy control section and a thicker solum.

Typical pedon of Clebit stony fine sandy loam, 10 to 30 percent slopes, in woodland, 1,500 feet west and 350 feet north of the southeast corner of sec. 23, T. 7 N., R. 23 E.

A1—0 to 4 inches; dark brown (10YR 3/3) stony fine sandy loam; weak fine granular structure; very friable; sandstone gravel makes up 25 percent of the volume, sandstone cobbles make up 10 percent, and stones make up 10 percent; strongly acid; clear wavy boundary.

B2—4 to 15 inches; brown (7.5YR 4/4) cobbly fine sandy loam; weak fine granular structure; friable; sandstone gravel makes up 25 percent of the volume, and sandstone cobbles make up 25 percent; very strongly acid; abrupt irregular boundary.

R—15 to 30 inches; hard, massive sandstone bedrock.

Solum thickness ranges from 10 to 20 inches. Reaction ranges from slightly acid to strongly acid in the A horizon and ranges from slightly acid to very strongly acid in the B horizon. Fragments of sandstone cover 0 to 40 percent of the surface.

The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3, or it has hue of 7.5YR, value of 3 to 5, and chroma of 2 to 4. It is gravelly fine sandy loam or stony fine sandy loam. Sandstone gravel makes up 5 to 50 percent of the volume, sandstone cobbles make up 0 to 15 percent, and stones make up 0 to 20 percent.

The B2 horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. It dominantly is cobbly fine sandy loam but ranges to gravelly fine sandy loam or very gravelly fine sandy loam. The total volume of fragments of sandstone is more than 35 percent. Sandstone gravel makes up 25 to 50 percent of the volume, and sandstone cobbles make up 10 to 25 percent.

Soils that are similar to Clebit soils except that they have 20 to 35 percent or less, by volume, fragments of sandstone were considered Clebit soils in naming the map unit. Their behavior is essentially like that of the Clebit soils.

Coushatta series

The Coushatta series consists of deep, well drained, moderately permeable soils that formed in stratified, predominantly loamy alluvium partly of Permian red bed origin. These nearly level to gently undulating soils are on the flood plain of the Arkansas River. Slopes are 0 to 3 percent. These soils have an apparent high water table at a depth of 4 to 6 feet during winter and spring. Soils of the Coushatta series are fine-silty, mixed, thermic Fluventic Eutrochrepts.

Coushatta soils are on landscapes with Latanier, Moreland, and Roxana soils. Latanier and Moreland soils are in lower lying positions on nearly level to gently undulating surfaces. Latanier soils have a clayey over loamy control section, and Moreland soils have a fine control section. Roxana soils, which are in higher lying positions, have a coarse-silty control section.

Typical pedon of Coushatta silt loam, rarely flooded, undulating, in a cultivated field, 1,000 feet south and 50 feet west of the northeast corner of the southeast quarter of sec. 14, T. 10 N., R. 24 E.

Ap—0 to 9 inches; dark brown (7.5YR 3/4) silt loam; moderate fine granular structure; friable; neutral; clear smooth boundary.

B21—9 to 15 inches; dark reddish brown (5YR 3/4) silt loam; weak fine subangular blocky structure; friable; mildly alkaline; gradual wavy boundary.

B22—15 to 35 inches; dark reddish brown (5YR 3/4) silty clay loam; weak fine subangular blocky structure; friable; moderately alkaline; gradual wavy boundary.

IIC1—35 to 42 inches; reddish brown (5YR 4/4) fine sandy loam; massive; very friable; bedding planes evident; calcareous; moderately alkaline; abrupt wavy boundary.

IIIC2—42 to 63 inches; reddish yellow (5YR 6/6) loamy fine sand; single grained; loose; bedding planes evident; calcareous; moderately alkaline.

Reaction ranges from slightly acid to neutral in the Ap horizon and from neutral to moderately alkaline in the B and C horizons. Depth to a calcareous horizon is 15 to 40 inches.

The Ap horizon has hue of 5YR or 7.5YR, value of 3 or 4, and chroma of 3 or 4. Texture dominantly is silt loam or silty clay loam, but it ranges to very fine sandy loam or loamy fine sand.

The B and C horizons have hue of 5YR or 7.5YR, value of 3 to 5, and chroma of 3 or 4; or hue of 5YR, value of 6, and chroma of 4 to 6. Texture of the B horizon is silt loam or silty clay loam. Texture of the C horizon is quite variable; it ranges from silt loam to loamy fine sand.

Soils that are similar to Coushatta soils except that they have a darker colored A horizon were considered

Coushatta soils in naming the map units. They are in areas too small to separate in mapping. Their behavior is essentially like that of the Coushatta soils.

Cowton series

The Cowton series consists of moderately deep, well drained, slowly permeable soils that formed in material that weathered predominantly from shale. These very gently sloping to moderately steep soils are on low ridges in the northern half of the county. Slopes range from 2 to 15 percent. Soils of the Cowton series are fine, mixed, thermic Ultic Hapludalfs.

Cowton soils are on the same landscapes as Stigler, Vian, Wing, and Wister soils, which soils are downslope from the Cowton soils. Stigler soils have gray mottles in the upper part of the argillic horizon and have a thicker solum than Cowton soils. Vian soils have a fine-silty control section, are moderately well drained, and are on convex slopes. Wing soils commonly are adjacent to drainageways and have a high content of sodium in the subsoil. Wister soils are generally on concave slopes, are moderately well drained, and are deeper to shale.

Typical pedon of Cowton loam, 5 to 15 percent slopes, in a native grass meadow about 2 miles south of Cowlington; 500 feet north and 75 feet east of the southwest corner of the southeast quarter of sec. 5, T. 9 N., R. 24 E.

A1—0 to 8 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; friable; sandstone gravel makes up 10 percent of the volume; medium acid; gradual smooth boundary.

B21t—8 to 14 inches; yellowish red (5YR 4/6) clay loam; moderate fine subangular blocky structure; friable; patchy clay films on faces of peds; sandstone gravel makes up 15 percent of the volume; strongly acid; gradual smooth boundary.

IIB22t—14 to 27 inches; dark red (2.5YR 3/6) silty clay; common fine distinct yellowish red mottles and coatings on faces of peds; moderate fine and medium blocky structure; firm; continuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

IIB3—27 to 34 inches; coarsely mottled red (2.5YR 4/6), reddish yellow (7.5YR 6/6), and light gray (10YR 7/1) silty clay; weak fine blocky structure; firm; continuous clay films on faces of peds; small fragments of shale make up 15 percent of the volume; very strongly acid; gradual irregular boundary.

IICr—34 to 40 inches; yellowish brown and gray soft shale.

Solum thickness is 20 to 40 inches. Reaction ranges from strongly acid to neutral in the A1 horizon, from very strongly acid to medium acid in the B21t horizon, and from very strongly acid to strongly acid in the IIB22t and IIB3 horizons.

The A1 horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. It is gravelly loam, loam, gravelly silt loam, silt loam, gravelly fine sandy loam, or fine sandy loam. Sandstone gravel makes up 0 to 20 percent of the volume. In some pedons, there is a 3- to 5-inch thick A12 horizon that is similar to the A11 horizon.

The B21t horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is gravelly clay loam, gravelly silty clay loam, clay loam, or silty clay loam. Sandstone gravel makes up 0 to 30 percent of the volume, and sandstone cobbles make up 0 to 10 percent.

The IIB22t horizon has hue of 2.5YR to 7.5YR, value of 3 to 6, and chroma of 6 to 8, and it has few to common mottles in shades of red, brown, and gray. The gray mottles are inherited from the parent material. Texture is clay loam, silty clay loam, clay, or silty clay; the clay content ranges from 35 to 70 percent, but it averages 35 to 60 percent clay in the upper 20 inches of the argillic horizon. Sandstone gravel makes up 0 to 10 percent of the volume, and small fragments of shale make up 0 to 15 percent.

The IIB3 horizon is mottled in hue of 2.5YR to 10YR, value of 4 to 7, and chroma of 1 to 8. It is shaly silty clay, shaly clay, silty clay, or clay. Small fragments of shale make up 5 to 25 percent of the volume.

The IICr horizon is soft shale that commonly is grayish and brownish, but it is also reddish in places.

Soils that are similar to Cowton soils except that they have a solum 40 to 60 inches thick and similar soils that have 5 to 15 percent cobbles, by volume, in the A12 horizon were considered Cowton soils in naming map units. Their behavior is essentially like that of the Cowton soils.

Crevasse series

The Crevasse series consists of deep, excessively drained, rapidly permeable soils that formed on flood plains in sandy alluvium. These gently undulating soils are on the flood plain of the Arkansas River. Slopes dominantly are 1 to 3 percent. These soils have an apparent high water table at a depth of 4 to 6 feet during winter and spring. Soils of the Crevasse series are mixed, thermic Typic Udipsamments.

Crevasse soils are on the same landscapes as Kiomatia and Oklared soils. Kiomatia soils are in lower positions and have thin strata of finer textured material in the control section. Oklared soils have a coarse-loamy control section and commonly are in higher positions.

Typical pedon of Crevasse loamy fine sand, rarely flooded, undulating, in a wooded area, 100 feet north and 200 feet east of the southwest corner of the southeast quarter of section 29, T. 10 N., R. 25 E.

A1—0 to 12 inches; yellowish brown (10YR 5/4) loamy fine sand; single grained; loose; calcareous; moderately alkaline; clear wavy boundary.
C1—12 to 56 inches; light yellowish brown (10YR 6/4) loamy fine sand; single grained; loose; bedding planes evident; calcareous; moderately alkaline; gradual wavy boundary.
C2—56 to 65 inches; light yellowish brown (10YR 6/4) medium sand; single grained; loose; bedding planes evident; gravel makes up 2 percent by volume; calcareous; moderately alkaline.

Reaction ranges from slightly acid through moderately alkaline. Some pedons are calcareous. Bedding planes are present in horizons below the A horizon.

The A horizon has hue of 10YR with value of 4 to 6 and chroma of 4 or with value of 5 and chroma of 6. The C horizon has hue of 10YR with value of 4 to 6 and chroma of 4 or with value of 5 or 6 and chroma of 6. Texture is sand, loamy sand, or loamy fine sand.

Cupco series

The Cupco series consists of deep, somewhat poorly drained, moderately slowly permeable soils that formed in silty sediments on flood plains. Slopes are less than 1 percent and nearly level to slightly depressional. These soils have a perched water table 1/2 foot to 2 feet below the surface during winter and spring. Soils of the Cupco series are fine-silty, siliceous, thermic Aeric Ochraqualfs.

Cupco soils are on landscapes with Neff and Rexor soils. Neff soils are in slightly higher positions, are commonly dark yellowish brown in the upper part of the argillic horizon, and are moderately well drained. Rexor soils are in slightly higher positions on the flood plain, are well drained, and are coarse-silty.

Typical pedon of Cupco silt loam, occasionally flooded, in a pasture, 1,100 feet north and 350 feet west of the southeast corner of the southwest quarter of sec. 36, T. 7 N., R. 25 E.

A1—0 to 11 inches; dark grayish brown (10YR 4/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak fine granular structure; friable; strongly acid; clear smooth boundary.
A2—11 to 21 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak fine granular structure; friable; very strongly acid; clear smooth boundary.
B21t—21 to 30 inches; grayish brown (10YR 5/2) silty clay loam; common fine distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; common clay films on faces of peds; very strongly acid; gradual wavy boundary.
B22t—30 to 55 inches; grayish brown (10YR 5/2) silty clay loam; many fine distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; common clay films on faces of peds; common fine black and yellowish brown concretions; strongly acid; gradual wavy boundary.
B3—55 to 83 inches; brown (10YR 4/3) silty clay loam; many fine distinct gray (10YR 6/1) and yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; patchy clay films on faces of peds; common fine black and yellowish brown concretions; strongly acid.

Solum thickness is more than 60 inches. Reaction ranges from strongly acid to slightly acid in the A1 horizon and is very strongly acid or strongly acid in the A2 horizon; it ranges from very strongly acid to slightly acid in the B21t horizon and from strongly acid to neutral in the B22t and B3 horizons. Few to many fine or medium mottles in shades of brown and gray are throughout the solum.

The A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Clay content ranges from 15 to 26 percent.

The A2 horizon, where present, is 3 to 10 inches thick. It has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. Clay content ranges from 15 to 26 percent.

The B21t horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Clay content of the B horizon ranges from 27 to 35 percent. In places coatings that have chroma of 1 or 2 are on faces of peds.

The B22t horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. In places coatings that have chroma of 1 or 2 are on faces of peds.

The B3 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. In places coatings that have chroma of 1 or 2 are on faces of peds.

Soils that are similar to Cupco soils except that they have 20 to 27 percent clay in the B21t horizon and similar soils that have 35 to 40 percent clay in the lower part of the B22t horizon and in the B3 horizon were considered Cupco soils in naming map units. Their behavior is essentially like that of the Cupco soils.

Garton series

The Garton series consists of deep, moderately well drained, slowly permeable soils that formed in loamy and clayey alluvium partly of Permian red bed origin. These nearly level soils are on the flood plain along the Arkansas River. Slope is 0 to 1 percent. These soils have a perched water table 2 to 3 feet below the surface during winter and spring. Soils of the Garton series are fine, mixed, thermic Aquic Argiudolls.

Garton soils are on the same landscape as Lela and Redport soils. Lela soils are clayey throughout and are in slightly lower positions. Redport soils have a fine-silty control section and are in slightly higher positions.

Typical pedon of Garton silty clay loam, rarely flooded, in a cultivated field, 1,200 feet south and 200 feet east of the northwest corner of sec. 5, T. 9 N., R. 27 E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silty clay loam; massive; friable; neutral; clear smooth boundary.
B1—6 to 17 inches; very dark grayish brown (10YR 3/2) silty clay loam; weak fine subangular blocky structure; friable; neutral; gradual smooth boundary.
B21t—17 to 33 inches; dark brown (7.5YR 3/2) silty clay loam; few fine distinct reddish brown (5YR 4/4) mottles; weak fine subangular blocky structure; firm; patchy clay films on faces of peds; neutral; gradual wavy boundary.
B22t—33 to 51 inches; reddish brown (5YR 4/3) silty clay; weak fine blocky structure; firm; patchy clay films on faces of peds; neutral; gradual wavy boundary.
B3—51 to 63 inches; reddish brown (5YR 4/4) clay loam; weak fine subangular blocky structure; friable; mildly alkaline.

Solum thickness is more than 60 inches. Reaction is slightly acid or neutral in the A and B1 horizons and is slightly acid to mildly alkaline in the B2t horizon. The B3 horizon is neutral to mildly alkaline.

The Ap horizon or B1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. In some pedons, the B1 horizon has few to common fine gray mottles.

The B21t horizon has hue of 5YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4. It has few to common reddish or brownish mottles. Texture is silty clay loam or clay.

The B22t horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is silty clay, clay loam, or silty clay loam. The B3 horizon has hue of 5YR or 7.5YR hue, value of 4 to 6, and chroma of 4 to 8. It is loam or clay loam.

Soils that are similar to Garton soils except that they do not decrease in clay content within 60 inches of the surface and similar soils that have value of 3 and chroma of 2 in the lower B2t horizon were considered Garton soils in naming the map units. Their behavior is essentially like that of the Garton soils.

Kamie series

The Kamie series consists of deep, well drained, moderately permeable soils that formed in predominantly loamy sediments on old stream terraces. These gently sloping to sloping soils are near to the Arkansas River flood plain. Slopes range from 3 to 8 percent. Soils of the Kamie series are fine-loamy, mixed, thermic Typic Paleudalfs.

Kamie soils are on the same landscape as McKamie and Shermore soils. McKamie soils are in intermingled areas and have a fine control section. The moderately well drained Shermore soils are on foot slopes and have a fragipan.

Typical pedon of Kamie loamy fine sand, 3 to 8 percent slopes, eroded, in a pasture, 1,600 feet north and 350 feet east of the southwest corner of sec. 17, T. 9 N., R. 26 E.

Ap—0 to 7 inches; brown (10YR 5/3) loamy fine sand; single grained; very friable; slightly acid; clear smooth boundary.
B21t—7 to 34 inches; yellowish red (5YR 4/6) sandy clay loam; weak fine subangular blocky structure; friable; patchy clay films on faces of peds and bridging sand grains; few thin coatings on peds of reddish yellow (7.5YR 7/6) loamy fine sand; strongly acid; gradual wavy boundary.
B22t—34 to 50 inches; yellowish red (5YR 5/6) sandy clay loam; few fine distinct red (2.5YR 4/6) mottles; weak fine subangular blocky structure; friable; patchy clay films on faces of peds and bridging sand grains; medium acid; gradual wavy boundary.
B3—50 to 75 inches; yellowish red (5YR 5/8) fine sandy loam; about 20 percent by volume is yellowish red (5YR 4/6) sandy clay loam in pockets, and about 3 percent is pockets of reddish yellow (7.5YR 6/6) clean fine sand; massive; very friable; patchy clay films on faces of peds and bridging sand grains; medium acid.

Solum thickness is 60 to 80 or more inches. Reaction ranges from neutral through medium acid in the A horizon, is medium acid or strongly acid in the B21t horizon, and ranges from medium acid to very strongly acid in the B22t and B3 horizons.

The Ap horizon or A1 horizon has hue of 10YR with value of 4 and chroma of 3 or 4 or with value of 5 and chroma of 3. In places it is a mixture of the A1 horizon and A2 horizon. Texture of the A horizon dominantly is loamy fine sand, but it ranges to fine sandy loam. In uneroded areas the A horizon is 8 to 20 inches thick.

In uneroded areas the A2 horizon is 4 to 14 inches thick. It has hue of 7.5YR or 10YR with value of 4 or 5 and chroma of 4 or with value of 5 and chroma of 6, or it has hue of 10YR, value of 4 or 5, and chroma of 3.

The B21t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6. It is sandy clay loam or clay loam.

The B22t horizon or B3 horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. The B22t horizon is sandy clay loam or clay loam. The B3 horizon is fine sandy loam or sandy clay loam. Skeletans or pockets of clean sand grains make up about 1 to 4 percent of the volume.

Soils that are similar to Kamie soils except that they have a B1 horizon or B21t horizon that has hue of 7.5YR with value of 4 and chroma of 4 or 6 or with value of 5 and chroma of 6 and that is fine sandy loam or sandy clay loam; similar soils that are loamy fine sand, sandy

clay, or clay at varying depths below 36 inches; similar soils that have mottles with chroma of 1 or 2 in the B3 horizon were all considered Kamie soils in naming the map units. Their behavior is essentially like that of the Kamie soils.

Kanima series

The Kanima series consists of deep, well drained, moderately permeable shaly soils on uplands that formed in material that weathered from shale deposited by recent strip mine operations. These strongly sloping to very steep soils are on spoil banks adjacent to strip pits. Slopes range from 10 to 50 percent. Soils of the Kanima series are loamy-skeletal, mixed, nonacid, thermic Udalfic Arents.

Kanima soils are not associated with other soils in a repeating landscape pattern but are in various landscape positions.

Typical pedon of Kanima shaly silty clay loam, 10 to 50 percent slopes, 900 feet south and 25 feet east of the northwest corner of sec. 3, T. 8 N., R. 24 E.

A1—0 to 6 inches; dark grayish brown (10YR 4/2) shaly silty clay loam; few fine faint yellowish brown (10YR 5/4) mottles; massive; friable; coarse fragments of shale make up 30 percent by volume; medium acid; diffuse wavy boundary.

C—6 to 75 inches; dark grayish brown (10YR 4/2) very shaly silty clay loam; few fine yellowish brown (10YR 5/4) fragments of silty clay; massive; friable; coarse fragments of shale make up 75 percent by volume; neutral.

All horizons are either shaly or very shaly loam, silt loam, clay loam, or silty clay loam. Reaction ranges from medium acid to moderately alkaline throughout. Fragments of coal range from a few to 5 percent of the volume.

The A horizon has hue of 2.5Y or 10YR, value of 3 or 4, and chroma of 2; or has hue of 2.5Y, value of 4, and chroma of 3. It is massive and hard or very hard when dry. Coarse fragments, predominantly shale, range from 15 to 90 percent by volume and typically are 15 to 50 percent. Cobbles and stones range from 0 to 5 percent by volume.

The C horizon has hue of 2.5Y with value of 5 and chroma of 2 or with value of 3 or 4 and chroma of 2 or 4, or it has hue of 10YR with value of 4 or 5 and chroma of 2 or 3 or with value of 3 and chroma of 2. It has fragments or pockets of soil of higher chroma. Coarse fragments, predominantly shale, range from 35 to 90 percent by volume but typically are 60 to 90 percent. Cobbles and stones range from 5 to 30 percent by volume. The C horizon contains pockets of soil material from the excavated area.

Kenn series

The Kenn series consists of deep, well drained, moderately permeable soils that formed in loamy alluvium that weathered from interbedded sandstone and shale. These nearly level to very gently sloping soils are on flood plains. Slopes range from 0 to 2 percent. Soils of the Kenn series are fine-loamy, siliceous, thermic Ultic Hapludalfs.

Kenn soils are on the same landscape as Ceda and Speer soils. Ceda soils either are in a complex with Kenn soils or are upstream. Ceda soils have a loamy-skeletal control section. Speer soils commonly are downstream from the Kenn soils. They do not have the gravelly lower horizon of Kenn soils.

Typical pedon of Kenn loam, in an area of Kenn-Ceda complex, occasionally flooded, in a pasture about 3 miles northwest of Wister, 600 feet south and 600 feet west of the northeast corner of sec. 10, T. 6 N., R. 24 E.

A1—0 to 7 inches; dark brown (10YR 3/3) loam; weak fine granular structure; friable; sandstone gravel makes up 5 percent of the volume; strongly acid; gradual wavy boundary.

B2t—7 to 29 inches; yellowish red (5YR 4/6) clay loam; weak fine subangular blocky structure; friable; sandstone gravel makes up 10 percent of the volume; discontinuous clay films on faces of peds; very strongly acid; clear irregular boundary.

IIB3—29 to 45 inches; brown (7.5YR 4/4) very gravelly clay loam; weak fine subangular blocky structure; friable; sandstone gravel makes up 40 percent, and sandstone cobbles make up 10 percent of the volume; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

IIC—45 to 70 inches; dark yellowish brown (10YR 4/4) cobbly loam; massive; friable; sandstone gravel makes up 70 percent of the volume, and sandstone cobbles make up 15 percent; very strongly acid.

Solum thickness is 40 to 60 inches. Depth to the gravelly IIB3 horizon ranges from 20 to 40 inches. Reaction ranges from strongly acid to slightly acid in the A horizon and is very strongly acid or strongly acid in the B2t, IIB3, and IIC horizons.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. It is loam, gravelly or very gravelly loam, very fine sandy loam, gravelly or very gravelly very fine sandy loam, fine sandy loam, and gravelly or very gravelly fine sandy loam. Sandstone gravel makes up 5 to 40 percent of the volume, and sandstone cobbles make up 0 to 10 percent.

The B1 horizon, where present, is 3 to 6 inches thick. It has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It has the same texture and percentage of coarse fragments as the A horizon but is slightly higher in clay content.

The B2t horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is gravelly clay loam, gravelly sandy clay loam, clay loam, or sandy clay loam. Sandstone gravel makes up 5 to 35 percent of the volume, and sandstone cobbles make up 0 to 10 percent.

The IIB3 horizon has colors similar to those of the B2t horizon. It is very gravelly sandy clay loam, very gravelly clay loam, cobbly sandy clay loam, cobbly clay loam, stony sandy clay loam, or stony clay loam. The total volume of fragments of sandstone in this horizon ranges from 40 to 90 percent. Sandstone gravel makes up 35 to 60 percent of the fragments, sandstone cobbles make up 5 to 30 percent, and stones make up 0 to 10 percent.

The IIC horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. It is very gravelly loam, very gravelly fine sandy loam, cobbly loam, cobbly fine sandy loam, stony loam, or stony fine sandy loam. The total volume of fragments of sandstone in this horizon ranges from 60 to 90 percent. Sandstone gravel makes up 40 to 75 percent, sandstone cobbles make up 10 to 30 percent, and stones make up 0 to 20 percent.

Soils that are similar to Kenn soils except that they have a gravelly IIB3 horizon beginning at a depth of 40 to 60 inches were considered Kenn soils in naming map units. Their behavior is essentially like that of the Kenn soils.

Kiomatia series

The Kiomatia series consists of deep, well drained, rapidly permeable soils that formed on flood plains in sandy alluvium that has thin strata of finer textured material. These nearly level to gently undulating soils are on the flood plain of the Arkansas River. Slopes are 0 to 3 percent and are gently undulating. These soils have an apparent high water table 4 to 5 feet below the surface during winter and spring. Soils of the Kiomatia series are sandy, mixed, thermic Typic Udifluvents.

Kiomatia soils are on the same landscape as Crevasse, Norwood, Oklared, and Severn soils, all of which commonly are in higher positions. Crevasse soils are sandy throughout. Norwood soils have a fine-silty control section, Severn soils have a coarse-silty control section, and Oklared soils have a coarse-loamy control section.

Typical pedon of Kiomatia fine sandy loam, rarely flooded, in a field, 300 feet south and 2,000 feet west of the northeast corner of sec. 4, T. 10 N., R. 27 E.

Ap—0 to 9 inches; brown (7.5YR 4/4) fine sandy loam; weak fine granular structure; friable; calcareous; moderately alkaline; abrupt wavy boundary.

C1—9 to 17 inches; light brown (7.5YR 6/4) loamy fine sand; single grained; loose; few thin strata of dark brown loamy fine sand; calcareous; moderately alkaline; abrupt wavy boundary.

C2—17 to 24 inches; brown (7.5YR 4/4) silt loam; massive; friable; few strata 1/4 to 3/4 inch thick of dark brown loamy fine sand; calcareous; moderately alkaline; abrupt wavy boundary.

C3—24 to 60 inches; light brown (7.5YR 6/4) loamy fine sand; single grained; loose; common thin strata of brown loamy fine sand; calcareous; moderately alkaline.

The soil ranges from slightly acid to moderately alkaline and is noncalcareous or calcareous. Bedding planes are present in all horizons below the Ap horizon.

The A horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4. Texture dominantly is fine sandy loam, but it ranges to loamy fine sand and very fine sandy loam.

The C horizon has hue of 7.5YR, value of 4 to 7, and chroma of 4. The average texture of the control section is fine sand or loamy fine sand stratified with darker loamy fine sand and finer textured material.

Latanier series

The Latanier series consists of deep, somewhat poorly drained, very slowly permeable soils that formed in reddish clayey sediment over loamy alluvium partly of Permian red bed origin. These nearly level to gently undulating soils are on the flood plains of the Arkansas River. Slopes dominantly are less than 1 percent. These soils have an apparent high water table 1 foot to 3 feet below the surface during winter and spring. Soils of the Latanier series are clayey over loamy, mixed, thermic Vertic Hapludolls.

Latanier soils are on the same landscape as Coushatta, Lynnville Variant, Moreland, Roxana, and Wabbaseka soils. Coushatta soils are slightly higher in position and have a fine-silty control section. Lynnville Variant soils are lower in position and have a fine-silty control section. Moreland soils are nearly level to undulating and are in slightly lower positions. They have a fine control section. Roxana soils are undulating and are in higher positions. They have a coarse-silty control section. The similar Wabbaseka soils are in higher positions, but the depth to contrasting textures is less than 20 inches.

Typical pedon of Latanier silty clay, rarely flooded, in a field, 1,600 feet south and 175 feet west of the northeast corner of sec. 16, T. 9 N., R. 25 E.

Ap—0 to 7 inches; dark reddish brown (5YR 3/2) silty clay; weak fine and medium blocky structure; very firm; neutral; gradual wavy boundary.

B2—7 to 31 inches; dark reddish brown (5YR 3/3) silty clay; weak very fine and fine blocky structure; very firm; calcareous; moderately alkaline; clear wavy boundary.

IIC1—31 to 57 inches; brown (7.5YR 5/4) silt loam; few fine distinct yellowish brown mottles; massive; friable; calcareous; mildly alkaline; abrupt wavy boundary.

IIC2—57 to 86 inches; highly stratified brown (7.5YR 5/4) very fine sandy loam and brown (7.5YR 5/4) silt loam; massive; friable; thin strata of reddish brown clay; calcareous; moderately alkaline.

Depth to contrasting texture ranges from 20 to 40 inches. Latanier soils are calcareous in some horizon at a depth of 8 to 36 inches. Reaction ranges from neutral to moderately alkaline in the A horizon. In places the lower A horizon is calcareous. The B horizon is moderately alkaline and typically is calcareous. The C horizon is alkaline.

The A horizon has hue of 5YR, value of 3, and chroma of 2 or 3. Texture is silty clay, but in places it is silty clay loam.

The B2 horizon has hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 3 or 4. This horizon is typically calcareous.

The C horizon has hue of 5YR or 7.5YR, value of 3 to 5, and chroma of 4. It is monotextured or stratified very fine sandy loam, silt loam, or silty clay loam. In some pedons a few yellowish brown mottles are present.

Soils that are similar to Latanier soils except that they are calcareous to the surface were considered Latanier soils in naming the map units. Their behavior is essentially like that of the Latanier soils.

Lela series

The Lela series consists of deep, somewhat poorly drained, very slowly permeable soils that formed in clayey sediment partly of Permian red bed origin. These nearly level to very gently sloping soils are on the flood plain of the Arkansas River. Slopes are dominantly less than 2 percent but range to 3 percent. These soils have an apparent high water table less than 3 feet below the surface during winter and spring. Soils of the Lela series are fine, mixed, thermic Typic Chromuderts.

Lela soils are on the same landscape as Garton, Pocola, and Redport soils. Garton and Pocola soils are in slightly higher positions and have an argillic horizon. Redport soils are higher in position and have a fine-silty control section.

Typical pedon of Lela silty clay, rarely flooded, 0 to 1 percent slopes, in a field, 1,800 feet east and 50 feet south of the northwest corner of sec. 18, T. 9 N., R. 25 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay; weak medium blocky structure; very firm; mildly alkaline; clear smooth boundary.

A1—8 to 20 inches; very dark grayish brown (10YR 3/2) silty clay; weak medium blocky structure; very firm; neutral; gradual wavy boundary.

AC—20 to 37 inches; very dark grayish brown (10YR 3/2) silty clay; weak medium blocky structure; very firm; few intersecting slickensides; mildly alkaline; gradual wavy boundary.

C1—37 to 43 inches; dark brown (7.5YR 3/2) silty clay; weak medium blocky structure; very firm; few intersecting slickensides; moderately alkaline; gradual wavy boundary.

C2—43 to 70 inches; dark reddish brown (5YR 3/2) silty clay; weak medium blocky structure; very firm; few calcium carbonate concretions; moderately alkaline.

Solum thickness ranges from 20 to 80 inches. During dry periods the soil has wide cracks that extend to a depth of 20 inches or more. The width of the wavy boundary between the A and AC horizons ranges from about 10 to 40 inches. If the A horizon is less than 12 inches thick, the moist value is 3 or less in more than half of the pedon.

The A horizon has hue of 10YR with value of 3 and chroma of 2 or 3 or with value of 2 and chroma of 2. It is clay or silty clay and neutral to moderately alkaline. In the overwash phase the A horizon is 8 to 16 inches thick. It has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. It dominantly is very fine sandy loam, but it ranges to silt loam.

The AC horizon has hue of 7.5YR, value of 3, and chroma of 2 or hue of 10YR with value of 3 and chroma of 2 or 3 or with value of 2 and chroma of 2. It is silty clay or clay and is neutral to moderately alkaline. Intersecting slickensides range from few to common and are within a depth of 40 inches.

The C horizon has hue of 5YR, value of 3, and chroma of 2 to 4; hue of 7.5YR, value of 3 or 4, and chroma of 2; or hue of 10YR with value of 4 and chroma of 4 or with value of 3 and chroma of 2. In some pedons, distinct or prominent mottles are below 40 inches. The C horizon is silty clay or clay and is calcareous or noncalcareous. Intersecting slickensides range from few to common.

Soils that are similar to Lela soils except that they have chroma of 1 in some horizons and similar soils that have hue of 5YR and value of 4 in the C horizon were considered Lela soils in naming map units. Their behavior is essentially like that of the Lela soils.

Lynnville Variant

The Lynnville Variant soils consist of deep, somewhat poorly drained, moderately slowly permeable soils that have a relatively high water table. These soils formed in stratified clayey and loamy alluvium partly of Permian red-bed origin. They are gently undulating to concave and commonly are adjacent to water bodies or small streams on the upland side of the Arkansas River flood plain. An apparent high water table is 1 foot to 3 feet below the surface during winter and spring. Lynnville

Variant soils are fine-silty, mixed, thermic Fluvaquentic Hapludolls.

Lynnville Variant soils are on the same landscape as Latanier, Moreland, Norwood, Oklared, and Wabbaseka soils. All of these soils are in higher lying positions. Latanier and Wabbaseka soils have a clayey over loamy control section, and Moreland soils have a fine control section. Norwood soils are fine-silty, and Oklared soils are coarse-loamy.

Typical pedon of Lynnville Variant silty clay, occasionally flooded, in a field, 250 feet north and 100 feet east of the southwest corner of sec. 12, T. 9 N., R. 26 E.

Ap—0 to 10 inches; dark brown (7.5YR 3/2) silty clay; weak fine blocky structure; firm; calcareous; moderately alkaline; clear smooth boundary.

C1—10 to 53 inches; dark brown (7.5YR 4/4) silty clay loam; common fine faint dark grayish brown (10YR 4/2) mottles and few fine distinct yellowish brown (10YR 5/4) mottles; massive; firm; few thin 1/4-inch thick strata of silty clay; saturated below a depth of 2 feet; calcareous; moderately alkaline; gradual smooth boundary.

C2—53 to 75 inches; reddish brown (5YR 4/3) silty clay loam; massive; friable; 1/2- to 1-inch thick strata of very dark gray (10YR 3/1) silty clay loam and silty clay make up about 30 percent; saturated; calcareous; moderately alkaline.

The soil is moderately alkaline and calcareous throughout. The control section on the average is 18 to 35 percent clay.

The A horizon has hue of 5YR or 7.5YR, value of 3, and chroma of 2 or 3. It dominantly is silty clay, but it ranges to clay or silty clay loam.

The C1 horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 3 or 4. On the average, it is silty clay loam and includes thin strata of silt loam, very fine sandy loam, and a few thin strata of silty clay.

The C2 horizon or C3 horizon, if present, has hue of 5YR to 10YR, value of 3 to 5, and chroma of 1 to 4. It is very fine sandy loam, silt loam, or silty clay loam that has thin strata of sandy clay loam, silty clay, and fine sandy loam.

Soils that are similar to Lynnville Variant soils except that they do not have gray mottles in the upper 16 inches of the solum were considered Lynnville Variant soils in naming the map units. Their behavior is essentially like that of the Lynnville Variant soils.

These soils are a Variant of the Lynnville series because they have a solum that is calcareous and moderately alkaline, have moderately slow permeability, and are somewhat poorly drained. Use, behavior, and management of these soils are different from those in the Lynnville series.

McKamie series

The McKamie series consists of deep, well drained, very slowly permeable soils that formed in loamy and clayey alluvium on terraces. These gently sloping to strongly sloping soils are near the Arkansas River flood plain. Slopes range from 3 to 12 percent. Soils of the McKamie series are fine, mixed, thermic Vertic Hapludalfs.

McKamie soils are on the same landscape as Kamie and Shermore soils. Kamie soils are in intermingled areas and have a fine-loamy control section. The moderately well drained Shermore soils are on foot slopes of adjacent uplands and have a fine-loamy control section.

Typical pedon of McKamie loam, 3 to 5 percent slopes, in a pasture, 800 feet north and 900 feet east of the southwest corner of the northeast quarter of sec. 16, T. 9 N., R. 25 E.

Ap—0 to 5 inches; brown (7.5YR 5/4) loam; weak fine granular structure; friable; medium acid; clear wavy boundary.

B21t—5 to 14 inches; red (2.5YR 4/6) clay; weak fine blocky structure; clay films on faces of peds; firm; strongly acid; gradual wavy boundary.

B22t—14 to 44 inches; red (2.5YR 4/6) clay; weak fine blocky structure; clay films on faces of peds; firm; common fine black concretions; medium acid; gradual smooth boundary.

IIB3—44 to 55 inches; red (2.5YR 4/6) silty clay loam; weak fine subangular blocky structure; friable; patchy clay films on faces of peds; few fine calcium carbonate concretions; neutral; gradual smooth boundary.

IIC—55 to 63 inches; red (2.5YR 5/6) silty clay loam; massive; friable; few thin strata of very fine sandy loam and silt loam; few fine calcium carbonate concretions; moderately alkaline.

Solum thickness ranges from 36 to 60 inches. Reaction ranges from slightly acid to strongly acid in the A horizon. The B horizon is medium acid to very strongly acid in the upper part and ranges from neutral to alkaline or calcareous below a depth of about 30 inches. McKamie soils crack when dry, but cracks rarely extend upward through the A horizon.

The A1 horizon or Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. The A2 horizon, where present, is up to 5 inches thick and has hue of 10YR, value of 6 or 7, and chroma of 3 or 4. Texture of the A horizon dominantly is loam, but it ranges to silt loam or very fine sandy loam.

The B2t horizon has hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 4 to 8. The texture is clay or silty clay. In places this horizon has few to common fine black concretions. Depth to where the soil is calcareous

commonly is more than 30 inches from the top of the argillic horizon.

The IIB3 horizon or IIC horizon has hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 6 or 8. Texture is clay loam, silty clay loam, silt loam, or very fine sandy loam. Few to common fine calcium carbonate concretions are in these horizons.

Soils that are similar to McKamie soils except that they do not decrease in clay content within 60 inches of the surface were considered McKamie soils in naming the map units. Their behavior is essentially like that of the McKamie soils.

Moreland series

The Moreland series consists of deep, somewhat poorly drained, very slowly permeable soils that formed in dominantly clayey alluvium partly of Permian red-bed origin. These nearly level to very gently sloping soils are on the Arkansas River flood plain. Slopes dominantly range from 0 to 2 percent, and in some areas they are slightly concave. A perched high water table is less than 1 1/2 feet below the surface during winter and spring. Soils of the Moreland series are fine, mixed, thermic Vertic Hapludolls.

Moreland soils are in slightly lower positions than the associated Coushatta, Latanier, Oklared, and Roxana soils. Coushatta soils have a fine-silty control section. Latanier soils are undulating and have a clayey over loamy control section. Oklared soils have a coarse-loamy control section. Roxana soils have a coarse-silty control section.

Typical pedon of Moreland silty clay, rarely flooded, in a field, 1,450 feet south and 100 feet west of the northeast corner of sec. 16, T. 9 N., R. 25 E.

Ap—0 to 10 inches; dark reddish brown (5YR 3/3) silty clay; weak fine blocky structure; very firm; mildly alkaline; clear smooth boundary.

A1—10 to 15 inches; dark reddish brown (5YR 3/3) silty clay; common fine faint dark reddish brown mottles; weak fine blocky structure; very firm; shiny surfaces on faces of peds; mildly alkaline; clear smooth boundary.

B21—15 to 33 inches; dark reddish brown (5YR 3/4) silty clay; few fine distinct reddish gray mottles; weak fine blocky structure; very firm; calcareous; moderately alkaline; clear wavy boundary.

B22—33 to 42 inches; dark reddish brown (5YR 3/3) silty clay; weak fine blocky structure; firm; few slickensides; calcareous; moderately alkaline; clear wavy boundary.

B3—42 to 63 inches; dark reddish brown (5YR 3/4) silty clay; weak fine blocky structure; firm; few slickensides in upper part; few thin strata of brown silty clay loam in lower part; calcareous; moderately alkaline.

Depth to calcareous layers ranges from 10 to 40 inches. Slickensides are present above 40 inches. Reaction is neutral or mildly alkaline in the A horizon and is moderately alkaline and calcareous in the B horizon. During dry periods the soil has wide cracks that extend to a depth of 20 inches or more.

The A horizon has hue of 5YR or 7.5YR, value of 3, and chroma of 2 or 3. It typically is silty clay, but in some areas it is silt loam or silty clay loam.

The B2 horizon has hue of 5YR or 7.5YR, value of 3, and chroma of 2 or has hue of 5YR, value of 3 or 4, and chroma of 3 or 4. The B3 horizon has hue of 5YR or 2.5YR, value of 3, and chroma of 4 or has hue of 5YR, value of 4, and chroma of 3 or 4. The B horizon is silty clay or silty clay loam and on the average is 35 to 60 percent clay. In places the B3 horizon has thin strata of silt loam or silty clay loam and a few calcium carbonate concretions.

Soils that are similar to Moreland soils except that they do not have grayish mottles within 30 inches of the surface were considered Moreland soils in naming the map units. Their behavior is essentially like that of the Moreland soils.

Neff series

The Neff series consists of deep, moderately well drained, moderately slowly permeable soils that formed in loamy alluvium on flood plains. These soils are saturated in winter and spring. Slopes range from 0 to 2 percent. A perched water table is 1/2 foot to 2 1/2 feet below the surface during winter and spring. Soils of the Neff series are fine-silty, siliceous, thermic Aquultic Hapludalfs.

Neff soils are on the same landscape as Cupco, Pacola, Rexor, and Speer soils. Cupco soils, which commonly are in slight depressions, are typically grayish brown in the upper part of the argillic horizon. Pocola soils have a fine control section. Rexor soils are in the more sloping areas and do not have gray mottles in the upper part of the argillic horizon. Speer soils are on higher lying surfaces, do not have gray mottles in the upper part of the argillic horizon, and have hue redder than 10YR in the subsoil.

Typical pedon of Neff silt loam, occasionally flooded, in a pasture, 850 feet north and 1,450 feet west of the southeast corner of sec. 15, T. 6 N., R. 25 E.

A1—0 to 14 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; neutral; gradual smooth boundary.

B1—14 to 23 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct light brownish gray (10YR 6/2) and common medium faint brown (10YR 5/3) mottles; weak medium subangular blocky structure; friable; few patchy clay films on faces of peds; few

fine yellowish brown and black concretions; strongly acid; gradual smooth boundary.

B2t—23 to 57 inches; dark yellowish brown (10YR 4/4) silty clay loam; many medium distinct light brownish gray (10YR 6/2) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; patchy clay films on faces of peds; common fine yellowish brown and black concretions; strongly acid; gradual smooth boundary.

B3—57 to 82 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine and medium distinct gray (10YR 6/1) and common fine and medium faint light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; patchy clay films on faces of peds; common fine yellowish brown and black concretions; very strongly acid.

Solum thickness is more than 60 inches. Reaction ranges from very strongly acid to medium acid in the A1 and B1 horizons, from very strongly acid to slightly acid in the B2t horizon, and from very strongly acid to moderately alkaline in the B3 horizon.

The A1 horizon has hue of 10YR, value of 4, and chroma of 2 to 4. It dominantly is silt loam, but it ranges to loam.

The B1 horizon has hue of 10YR with value of 4 or 5 and chroma of 3 or 4 or with value of 6 and chroma of 3. Fine or medium grayish or brownish mottles range from none to common. The B1 horizon is loam or silt loam.

The B2t horizon has hue of 10YR with value of 4 to 7 and chroma of 3, with value of 4 or 5 and chroma of 4, or with value of 6 and chroma of 2. Texture is silt loam or silty clay loam that is 24 to 35 percent clay. The B3 horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Texture is silt loam or silty clay loam that is 18 to 35 percent clay. Common to many fine grayish or brownish mottles are throughout the B2t horizon and B3 horizon. In these horizons fine to medium black and yellowish brown concretions range from none to common throughout.

Soils that are similar to Neff soils except that they are gray or light brownish gray in the B1 horizon or upper part of the B2t horizon were considered Neff soils in naming the map units. Their behavior is essentially like that of the Neff soils.

Norwood series

The Norwood series consists of deep, well drained, moderately permeable soils that formed in stratified loamy alluvium partly of Permian red bed origin. These nearly level to gently undulating soils are on the flood plain of the Arkansas River. Slopes are 0 to 3 percent. Soils of the Norwood series are fine-silty, mixed (calcareous), thermic Typic Udifluvents.

Norwood soils are on the same landscape as Kiomatia, Lynnville Variant, Oklared, and Severn soils. Kiomatia and Oklared soils commonly are gently undulating and are in lower positions on the landscape. Lynnville Variant soils are in lower positions and have a relatively high water table. Kiomatia soils have a sandy control section, and Oklared soils have a coarse-loamy control section. Severn soils are in higher positions and have a coarse-silty control section.

Typical pedon of Norwood silty clay loam, rarely flooded, 0 to 1 percent slopes, in a field, 2,100 feet east and 1,700 feet north of the southwest corner of sec. 36, T. 10 N., R. 25 E.

Ap—0 to 9 inches; reddish brown (5YR 4/4) silty clay loam; weak fine granular structure; friable; moderately alkaline; abrupt smooth boundary.

B2—9 to 25 inches; reddish brown (5YR 4/3) silty clay loam; weak fine subangular blocky structure; friable; calcareous; moderately alkaline; clear wavy boundary.

C1—25 to 34 inches; reddish brown (5YR 4/4) silt loam; massive; friable; bedding planes evident; has a 1 1/2-inch stratum of silty clay; calcareous; moderately alkaline; gradual wavy boundary.

C2—34 to 42 inches; brown (7.5YR 4/4) very fine sandy loam; massive; very friable; bedding planes evident; calcareous; moderately alkaline; clear wavy boundary.

C3—42 to 51 inches; reddish brown (5YR 5/4) very fine sandy loam; massive; very friable; bedding planes evident; calcareous; moderately alkaline; abrupt wavy boundary.

IIC4—51 to 54 inches; dark reddish brown (5YR 3/4) silty clay; moderate fine blocky structure; firm; calcareous; moderately alkaline; clear wavy boundary.

IIC5—54 to 60 inches; dark reddish brown (5YR 3/4) silty clay loam; massive; firm; bedding planes evident; calcareous; moderately alkaline; abrupt wavy boundary.

IIC6—60 to 68 inches; dark reddish brown (5YR 3/4) silty clay; weak fine blocky structure; firm; calcareous; moderately alkaline.

The Ap horizon is mildly alkaline or moderately alkaline but is neutral in areas that are highly fertilized. It is calcareous in places. The B and C horizons are moderately alkaline and calcareous.

The Ap horizon has hue of 5YR or 7.5YR, value of 3 or 4, and chroma of 3 or 4. It is silty clay loam or loam.

The B horizon, where present, has hue of 5YR, value of 3 or 4, and chroma of 3 or 4. It is dominantly silty clay loam, but it commonly has strata of finer and coarser textured material.

The C horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4; or has hue of 5YR, value of 5, and chroma of 6. It commonly is silt loam or silty clay loam in the control section. It has thin strata ranging from fine sandy loam to silty clay.

Octavia series

The Octavia series consists of deep, well drained, moderately slowly permeable soils that formed in loamy colluvium over clay. The clay weathered from shale. These gently sloping to very steep stony soils are on colluvial benches and foot slopes of the Ouachita Mountains and associated mountains. Slopes range from 4 to 50 percent. Soils of the Octavia series are fine-loamy, siliceous, thermic Typic Paleudults.

Octavia soils are on the same landscape as Bengal, Carnasaw, Caston, and Panama soils. Bengal and Carnasaw soils are on crests and side slopes and have a clayey control section. Caston and Panama soils are in intermingled areas, and they have a loamy-skeletal control section.

Typical pedon of Octavia stony fine sandy loam, in an area of Octavia-Carnasaw complex, cool, 15 to 35 percent slopes, about 4 miles south of Muse, 1,500 feet north and 1,150 feet east of the southwest corner of sec. 27, T. 2 N., R. 24 E.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) stony fine sandy loam; weak fine granular structure; friable; fragments of sandstone make up 30 percent by volume; medium acid; clear wavy boundary.

A2—3 to 6 inches; yellowish brown (10YR 5/4) stony fine sandy loam; weak fine granular structure; friable; fragments of sandstone make up 30 percent by volume; strongly acid; clear wavy boundary.

B1—6 to 18 inches; strong brown (7.5YR 5/6) gravelly loam; weak fine granular structure; friable; fragments of sandstone make up 20 percent by volume; very strongly acid; gradual smooth boundary.

B21t—18 to 30 inches; strong brown (7.5YR 5/6) gravelly clay loam; weak fine subangular blocky structure; friable; fragments of sandstone make up 20 percent by volume; nearly continuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

B22t—30 to 48 inches; yellowish red (5YR 5/6) gravelly clay loam; many coarse distinct strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; friable; fragments of sandstone make up 20 percent by volume; nearly continuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

IIB23t—48 to 65 inches; coarsely mottled red (2.5YR 4/6), strong brown (7.5YR 5/6), and light gray (10YR 7/1) clay; weak fine blocky structure; firm; fragments of sandstone and shale make up 5 percent by volume; patchy clay films on faces of peds; very strongly acid.

Solum thickness is 60 inches or more. Surface cover of sandstone ranges from 3 to 40 percent. Reaction ranges from very strongly acid to medium acid in the A horizon and is very strongly acid or strongly acid in the B horizon. In the A, B1, B21t, and B22t horizons, fragments of sandstone make up 5 to 35 percent of the volume, and sandstone gravel makes up 5 to 25 percent. In the A and B1 horizons, sandstone cobbles and stones make up 0 to 25 percent. In the B21t horizon and B22t horizons, sandstone cobbles and stones make up 0 to 10 percent. In the IIB23t horizon, fragments of sandstone and shale make up 5 to 40 percent; small fragments of shale and sandstone gravel make up 5 to 30 percent; and sandstone cobbles and stones make up 0 to 20 percent.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 3. It dominantly is stony fine sandy loam, but it ranges to stony loam, loam, cobbly fine sandy loam, cobbly loam, or gravelly loam.

The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It has the same texture as the A1 horizon.

The B1 horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 6. It has the same texture as the A horizon but is slightly higher in clay content. The B1 horizon of some pedons is up to 19 inches thick.

The B21t horizon or B22t horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 6 to 8. It is gravelly clay loam, gravelly sandy clay loam, sandy clay loam, or clay loam.

The IIB23t horizon has the same color as the B2t horizon or is coarsely mottled in hue of 2.5YR to 10YR, value of 4 to 7, and chroma of 1 to 8. It is shaly clay, shaly clay loam, cobbly clay, cobbly clay loam, gravelly clay, gravelly clay loam, clay loam, or clay. Clay content ranges from 35 to 60 percent.

Soils that are similar to Octavia soils except that they have shale or sandstone bedrock at a depth of 50 to 60 inches were considered Octavia soils in naming the map units. Their behavior is essentially like that of the Octavia soils.

Oklared series

The Oklared series consists of deep, well drained, moderately rapidly permeable soils that formed in stratified loamy and sandy alluvium partly of Permian red bed origin. These nearly level to gently undulating soils are on the flood plain of the Arkansas River. Slopes dominantly are 0 to 3 percent and gently undulating. An apparent high water table is 4 to 5 feet below the surface during winter and spring. Soils of the Oklared series are coarse-loamy, mixed (calcareous), thermic Typic Udifluvents.

Oklared soils are on the same landscape as Crevasse, Kiomatia, Lynnville Variant, Moreland, Norwood, Severn, and Wabbaseka soils. Except for Norwood soils, all of these associated soils are on lower flood plains. Norwood soils are in higher positions. Crevasse soils are sandy throughout and Kiomatia soils are sandy and have strata of finer material. Lynnville Variant and Norwood soils have a fine-silty control section; Moreland soils

have a fine control section; Severn soils have a coarse-silty control section; and Wabbaseka soils have a clayey over loamy control section.

Typical pedon of Oklared fine sandy loam, rarely flooded, in a field, 500 feet north and 2,500 feet west of the southeast corner of sec. 25, T. 10 N., R. 25 E.

Ap—0 to 6 inches; dark brown (7.5YR 4/4) fine sandy loam; weak fine granular structure; friable; calcareous; moderately alkaline; clear wavy boundary.

C1—6 to 13 inches; brown (7.5YR 5/4) fine sandy loam; massive; friable; distinct bedding planes; calcareous; moderately alkaline; clear wavy boundary.

C2—13 to 19 inches; light brown (7.5YR 6/4) loamy fine sand; single grained; loose; distinct bedding planes; calcareous; moderately alkaline; clear wavy boundary.

C3—19 to 32 inches; reddish brown (5YR 5/4) very fine sandy loam; massive; friable; distinct bedding planes; calcareous; moderately alkaline; clear wavy boundary.

C4—32 to 63 inches; brown (7.5YR 5/4) fine sandy loam; massive; friable; distinct bedding planes; few thin strata of loamy fine sand and very fine sandy loam; calcareous; moderately alkaline.

Bedding planes are evident in the control section. Reaction is calcareous and moderately alkaline throughout.

The Ap horizon or A1 horizon has hue of 5YR or 7.5YR, value of 3 to 5, and chroma of 3 or 4. It is dominantly fine sandy loam, but it ranges to very fine sandy loam.

The C horizon has hue of 5YR, value of 5 to 7, and chroma of 4 to 8 or hue of 7.5YR, value of 5 to 7, and chroma of 4 to 6. It is dominantly fine sandy loam, but in places some subhorizons are loamy fine sand, very fine sandy loam, or silt loam. In places the C horizon has thin strata of coarser or finer textured material.

Soils that are similar to Oklared soils except that they are neutral to moderately alkaline but noncalcareous were considered Oklared soils in naming the map units. Their behavior is essentially like that of the Oklared soils.

Panama series

The Panama series consists of deep, well drained, moderately slowly permeable, stony soils that formed in loamy colluvium over clay. These steep to very steep soils are on colluvial benches and foot slopes in the Ouachita mountains. Slopes range from 30 to 50 percent. Soils of the Panama series are loamy-skeletal, siliceous, thermic Typic Paleudults.

Panama soils are on the same landscape as Carnasaw, Caston, Octavia, and Pirum soils. Carnasaw soils are on crests and side slopes and have a clayey control section. Caston soils have a loamy-skeletal control section but are not underlain by clay. Octavia and Pirum soils are intermingled and they have a fine-loamy control section. Also Pirum soils have sandstone bedrock at a depth of 20 to 40 inches.

Typical pedon of Panama stony fine sandy loam, in an area of Pirum-Octavia-Panama association, steep, in woodland, 2,300 feet south and 400 feet west of the northeast corner of sec. 17, T. 1 N., R. 24 E.

A1—0 to 5 inches; very dark grayish brown (10YR 3/2) stony fine sandy loam; weak fine granular structure; friable; fragments of sandstone make up 50 percent by volume; medium acid; clear wavy boundary.

A2—5 to 10 inches; yellowish brown (10YR 5/4) stony fine sandy loam; weak fine granular structure; friable; fragments of sandstone make up 50 percent by volume; strongly acid; gradual smooth boundary.

B1—10 to 21 inches; strong brown (7.5YR 5/6) stony fine sandy loam; weak fine granular structure; friable; fragments of sandstone make up 50 percent by volume; strongly acid; gradual smooth boundary.

B21t—21 to 30 inches; yellowish red (5YR 5/6) very gravelly sandy clay loam; weak fine subangular blocky structure; friable; discontinuous clay films on faces of peds; fragments of sandstone make up 45 percent by volume; very strongly acid; gradual smooth boundary.

B22t—30 to 42 inches; yellowish red (5YR 5/6) very gravelly clay loam; weak fine subangular blocky structure; friable; discontinuous clay films on faces of peds; fragments of sandstone make up 45 percent by volume; very strongly acid; clear wavy boundary.

IIB23t—42 to 65 inches; mottled brownish yellow (10YR 6/6), light gray (10YR 7/1), and red (2.5YR 4/6) shaly clay; weak fine blocky structure; firm; fragments of sandstone and shale make up 30 percent by volume; clay films on faces of peds; very strongly acid.

Solum thickness is more than 60 inches. Reaction ranges from very strongly acid to medium acid in the A and B1 horizons and is very strongly acid in the B2t and IIB2t horizons. The surface cover of sandstone ranges from 3 to 40 percent. Coarse fragments of sandstone in the A and B1 horizons range from 10 to 75 percent, by volume. Sandstone gravel in the A and B1 horizons ranges from 10 to 40 percent, and sandstone cobbles and stones range from 15 to 45 percent. Coarse fragments of sandstone in the B2t horizon range from 35 to 70 percent, by volume. Sandstone gravel in the B2t horizon ranges from 25 to 50 percent, and sandstone cobbles and stones range from 10 to 20 percent. Sandstone gravel and small fragments of shale in the IIB2t horizon range from 5 to 65 percent.

The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. The A2 horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 to 6.

The B1 horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 6. The B2t horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 6 to 8. In places, the B22t horizon has pale brown mottles. Texture of the fine earth fraction is clay loam or sandy clay loam.

The IIB2t horizon is coarsely mottled in shades of red, brown, and gray. Texture of the fine earth fraction is either clay loam or clay and has 35 to 60 percent clay.

Soils that are similar to Panama soils except that they have shale or sandstone bedrock at a depth of 50 to 60 inches were considered Panama soils in naming the map units. Their behavior is essentially like that of the Panama soils.

Pirum series

The Pirum series consists of moderately deep, well drained, moderately permeable soils that formed in loamy material that has weathered from sandstone. These very gently sloping to very steep soils are on low lying ridges and mountains throughout the county. Slopes range from 2 to 60 percent. Soils of the Pirum series are fine-loamy, siliceous, thermic Typic Hapludults.

Pirum soils are on the same landscape as Bengal, Carnasaw, Caston, Clebit, Octavia, and Panama soils. Bengal soils are on low-lying ridges and have a clayey control section. Caston, Octavia, and Panama soils are on side slopes and foot slopes, and Carnasaw and Clebit soils are on ridgetops and side slopes. Caston, Clebit, and Panama soils have a loamy-skeletal control section. Carnasaw soils have a clayey control section. Octavia soils formed in loamy colluvium over clay.

Typical pedon of Pirum stony fine sandy loam, in an area of Pirum-Octavia-Panama association, steep, in woodland, 2,000 feet south and 600 feet west of the northeast corner of sec. 28, T. 2 N., R. 24 E.

A1—0 to 6 inches; brown (10YR 4/3) stony fine sandy loam; moderate fine granular structure; friable; sandstone gravel makes up 10 percent of the volume, sandstone cobbles make up 5 percent, and stones make up 15 percent; medium acid; clear smooth boundary.

B1—6 to 11 inches; strong brown (7.5YR 5/6) loam; weak fine granular structure; friable; sandstone gravel makes up 10 percent of the volume; very strongly acid; gradual wavy boundary.

B21t—11 to 17 inches; yellowish red (5YR 5/6) sandy clay loam; moderate fine subangular blocky structure; friable; few patchy clay films on faces of peds; sandstone gravel makes up 10 percent of the volume; very strongly acid; gradual wavy boundary.

B22t—17 to 30 inches; yellowish red (5YR 5/8) sandy clay loam; moderate fine subangular blocky structure; friable; patchy clay films on faces of peds; sandstone gravel makes up 5 percent of the volume; very strongly acid; abrupt irregular boundary.

R—30 to 40 inches; yellowish red sandstone bedrock, fractured and tilted.

Solum thickness ranges from 20 to 40 inches. Reaction ranges from medium acid to strongly acid in the A horizon and from strongly acid to very strongly acid in the B horizon. The surface cover of sandstone ranges from 0 to 40 percent. Total fragments of sandstone in each of the A and B horizons range from 0 to 30 percent, by volume. Sandstone gravel in the A horizon makes up 0 to 25 percent of the volume, sandstone cobbles make up 0 to 10 percent, and stones make up 0 to 20 percent. In the B horizon sandstone gravel makes up 0 to 25 percent of the volume, and sandstone cobbles make up 0 to 15 percent.

The A1 horizon has hue of 10YR, value of 4, and chroma of 3 or 4. The Ap horizon has hue of 10YR, value of 5, and chroma of 3 or 4; or it has hue of 7.5YR, value of 4 or 5, and chroma of 4. The A2 horizon, where present, has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Texture is fine sandy loam, gravelly fine sandy loam, or stony fine sandy loam.

The B1 horizon, where present, has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. It is fine sandy loam, loam, gravelly fine sandy loam, or gravelly loam.

The B2t horizon has hue of 7.5YR, value of 5, and chroma of 6 or 8; or it has hue of 5YR, value of 4 to 6, and chroma of 4 to 8. The B2t horizon is sandy clay loam, clay loam, loam, gravelly sandy clay loam, gravelly clay loam, or gravelly loam.

Soils that are similar to Pirum soils except that they have hue of 10YR, value of 3, and chroma of 2 or 3 in the A1 horizon; similar soils that have hue of 2.5YR in the B horizon; and similar soils 20 to 40 inches thick over sandstone that have a loamy-skeletal control section were considered Pirum soils in naming the map units. Their behavior is essentially like that of Pirum soils.

Pocola series

The Pocola series consists of deep, somewhat poorly drained, very slowly permeable soils that formed in loamy and clayey alluvium. The upper part of the profile is sediment from the Poteau River, and the lower part is calcareous, clayey sediment from the Arkansas River that derived partly from Permian red beds. These nearly level soils are on the Poteau River flood plain about 3 to 6 miles upstream from the junction of the flood plains of the Arkansas and Poteau Rivers. Slopes commonly are 0 to 1 percent, but range to 2 percent. A perched water table is 1/2 foot to 2 feet below the surface during winter and spring. Soils of the Pocola series are fine, mixed, thermic Vertic Ochraqualfs.

Pocola soils are on the same landscape as Lela and Neff soils. Lela soils are downstream, and the Neff soils are upstream. Lela soils are clayey, and Neff soils have a fine-silty control section.

Typical pedon of Pocola silt loam, occasionally flooded, in a pasture, 700 feet north and 1,600 feet east of the southwest corner of sec. 32, T. 9 N., R. 26 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; slightly acid; clear smooth boundary.

B21tg—8 to 13 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine faint gray and yellowish brown mottles; weak fine subangular blocky structure; friable; nearly continuous clay films on faces of peds; strongly acid; clear smooth boundary.

B22tg—13 to 25 inches; very dark grayish brown (10YR 3/2) silty clay; common fine distinct gray and common fine prominent red mottles; weak fine blocky structure; very firm; nearly continuous clay films on faces of peds; few fine black and yellowish brown concretions; strongly acid; gradual smooth boundary.

B23tg—25 to 57 inches; very dark grayish brown (10YR 3/2) silty clay; few fine distinct gray mottles; weak fine blocky structure; very firm; nearly continuous clay films on faces of peds; few fine yellowish brown and black concretions; slightly acid; diffuse smooth boundary.

B3—57 to 67 inches; dark brown (10YR 3/3) silty clay; weak fine blocky structure; very firm; nearly continuous clay films on faces of peds; common fine black concretions; gray coatings on faces of few peds; moderately alkaline; gradual smooth boundary.

C—67 to 81 inches; dark reddish brown (5YR 3/4) silty clay; massive; very firm; common fine black concretions; gray coatings on faces of few peds; few fine calcium carbonate concretions at 76 inches; calcareous; moderately alkaline.

Solum thickness is more than 60 inches. Reaction ranges from strongly acid to slightly acid in the A and B21tg horizons and from strongly acid to moderately alkaline but noncalcareous in the B22t and B23t horizons; it is moderately alkaline in the B3 and C horizons, which commonly are calcareous. Few to common fine black and yellowish brown concretions are in the subsoil. When dry the soil has cracks that extend to a depth of about 30 inches.

The A horizon has hue of 10YR with value of 4 and chroma of 2 or 3 or with value of 3 and chroma of 2. It is dominantly silt loam, but it ranges to loam, clay loam, or silty clay loam.

The B21tg horizon has hue of 10YR with value of 4 or 5 and chroma of 1 or with value of 3 or 4 and chroma of 2. Texture is clay loam or silty clay loam, and the clay content commonly is less than 35 percent. The B22tg and B23tg horizons have hue of 10YR with value of 3 to 7 and chroma of 1 or with value of 3 or 4 and chroma of 2. Texture is silty clay or clay. The content of clay in the control section averages 40 to 60 percent. In some pedons there are few to common fine red, brown, and gray mottles.

The B3 horizon, where present, has hue of 5YR or 7.5YR, value of 4, and chroma of 3 or 4 or has hue of 10YR, value of 3 or 4, and chroma of 3. It is silty clay or clay. Fine calcium carbonate concretions range from none to common.

The C horizon has hue of 5YR or 7.5YR, value 4, and chroma of 4 or has hue of 5YR with value of 3 and chroma of 4 or with value of 4 and chroma of 2. It is silty clay or clay. Fine calcium carbonate concretions range from few to common.

Soils that are similar to Pocola soils except that they are silty clay loam to a depth of 30 inches and have clay content of less than 35 percent were considered Pocola soils in naming the map units. Their behavior is essentially like that of the Pocola soils.

Redport series

The Redport series consists of deep, well drained, moderately permeable soils that formed in loamy alluvium partly of Permian red bed origin. These nearly level soils are on the flood plain of the Arkansas River. Slopes are 0 to 1 percent. Soils of the Redport series are fine-silty, mixed, thermic Cumulic Hapludolls.

Redport soils are on the same landscape as Garton and Lela soils. Garton and Lela soils are in lower lying positions and have a fine control section.

Typical pedon of Redport silty clay loam, rarely flooded, in a cultivated field, 1,400 feet north and 2,000 feet east of the southwest corner of sec. 31, T. 10 N., R. 27 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay loam; weak fine subangular blocky structure; firm; neutral; gradual smooth boundary.

A11—7 to 19 inches; very dark gray (10YR 3/1) silty clay loam; moderate fine subangular blocky structure; firm; neutral; gradual smooth boundary.

A12—19 to 30 inches; very dark grayish brown (10YR 3/2) silty clay loam; weak fine subangular blocky structure; friable; neutral; gradual smooth boundary.

B21—30 to 38 inches; dark brown (7.5YR 3/2) silty clay loam; few fine distinct very dark grayish brown (10YR 3/2) mottles; weak fine subangular blocky structure; friable; neutral; gradual smooth boundary.

B22—38 to 57 inches; reddish brown (5YR 4/3) clay loam; few fine distinct dark brown (7.5YR 3/2) mottles; weak fine subangular blocky structure; friable; neutral; gradual smooth boundary.

C—57 to 65 inches; reddish brown (5YR 4/4) sandy clay loam; massive; friable; neutral.

Solum thickness ranges from 36 to 60 inches or more. Thickness of the mollic epipedon ranges from 24 to 40 inches.

The A horizon has hue of 10YR, value of 3, and chroma of 1 to 3. Reaction ranges from neutral to moderately alkaline.

The B horizon has hue of 7.5YR or 10YR, value of 3, and chroma of 2; or it has hue of 5YR, value of 2 to 4, and chroma of 3 or 4. Mottles are not in some pedons. This horizon is silty clay loam or clay loam in the upper part and silty clay loam, clay loam, or sandy clay loam in the lower part. It is neutral and noncalcareous.

The C horizon, where present, has hue of 5YR, value of 4, and chroma of 4 or 6. Faint mottles are in some pedons. This horizon is sandy clay loam or fine sandy loam. It is neutral and noncalcareous.

The Redport soils in this county are considered taxadjuncts to the Redport series. They have hue of 10YR or 7.5YR in the upper part of the solum and are not calcareous throughout the control section. Use, behavior, and management of these soils are similar to those in the Redport series.

Rexor series

The Rexor series consists of deep, well drained, moderately permeable soils that formed in silty alluvium on flood plains. Slopes are short and range from 0 to 3 percent. A perched water table is 3 to 5 feet below the surface during winter and spring. Soils of the Rexor series are fine-silty, siliceous, thermic Ultic Hapludalfs.

Rexor soils are on the same landscape as Cupco, Neff, and Speer soils. The somewhat poorly drained Cupco soils commonly are in depressions and are grayish brown in the argillic horizon. The moderately well drained Neff soils have gray mottles in the upper 10 inches of the argillic horizon and commonly are in the less sloping areas of the flood plain. Speer soils are in the same position as Rexor soils, but they have a fine-loamy control section.

Typical pedon of Rexor silt loam, occasionally flooded, 1,600 feet west and 700 feet south of the northeast corner of sec. 5, T. 6 N., R. 26 E.

A1—0 to 10 inches; dark brown (10YR 3/3) silt loam; weak fine granular structure; friable; neutral; gradual smooth boundary.

B21t—10 to 31 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine subangular blocky structure; friable; discontinuous clay films; very strongly acid; gradual smooth boundary.

B22t—31 to 65 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct gray mottles; weak fine subangular blocky structure; friable; discontinuous clay films; very strongly acid.

Solum thickness is 60 inches or more. Reaction ranges from medium acid to very strongly acid, but the surface layer ranges to neutral in areas where lime has been added.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The texture dominantly is silt loam, but it ranges to loam.

The B2t horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. Most pedons have mottles in shades of gray and brown at depths below 30 inches. This horizon is silt loam, silty clay loam, or clay loam; the clay content ranges from 20 to 35 percent. Fine and medium black and yellowish brown concretions range from none to many.

The B3 horizon, where present, has hue of 10YR, value of 5, and chroma of 4 or 6. It has few to common fine or medium mottles in shades of gray and brown. This horizon is loam, silt loam, or silty clay loam. Fine and medium black and yellowish brown concretions range from none to many.

Roxana series

The Roxana series consists of deep, well drained, moderately permeable soils that formed in stratified loamy alluvium partly of Permian red bed origin. These nearly level to gently undulating soils are on the flood plain of the Arkansas River. Most areas have been mechanically smoothed. However, some areas of soils that have not been reworked are gently undulating. Slope dominantly is less than 1 percent but ranges to as much as 3 percent along the short, irregular slopes in undulating areas. An apparent high water table is 4 to 6 feet below the surface during winter and spring. Soils of the Roxana series are coarse-silty, mixed, nonacid, thermic Typic Udifluvents.

Roxana soils are on landscapes with Coushatta, Latanier, and Moreland soils. The Coushatta, Latanier, and Moreland soils are in lower lying positions. Coushatta soils have a fine-silty control section, Latanier soils have a clayey over loamy control section, and Moreland soils have a fine control section.

Typical pedon of Roxana very fine sandy loam, rarely flooded, in a field, 400 feet south and 150 feet east of the northwest corner of sec. 14, T. 10 N., R. 24 E.

Ap—0 to 9 inches; brown (7.5YR 4/4) very fine sandy loam; weak fine granular structure; very friable; mildly alkaline; clear smooth boundary.

C1—9 to 36 inches; brown (7.5YR 5/4) very fine sandy loam; massive; very friable; distinct bedding planes; mildly alkaline; clear wavy boundary.

C2—36 to 44 inches; brown (7.5YR 5/4) fine sandy loam; massive; very friable; distinct bedding planes; moderately alkaline; abrupt wavy boundary.

C3—44 to 62 inches; brown (7.5YR 5/4) very fine sandy loam; massive; very friable; distinct bedding planes; moderately alkaline.

Bedding planes are present in the control section. Reaction ranges from slightly acid to moderately alkaline in the A horizon and from neutral to moderately alkaline in the C horizon.

The Ap horizon has hue of 7.5YR or 10YR, value of 3, and chroma of 4 or has hue of 7.5YR, value of 4, and chroma of 4. It is dominantly very fine sandy loam, but it ranges to loam and silt loam.

The C horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is dominantly very fine sandy loam, but it commonly has thin strata of silt loam and fine sandy loam. In places, the C horizon has thin strata of coarser or finer textured material.

Sallisaw series

The Sallisaw series consists of deep, well drained, moderately permeable soils that formed in loamy and gravelly alluvium (fig. 14). These very gently sloping to moderately steep soils are on stream terraces, local alluvial fans, and outwash plains. The slope is dominantly 1 to 5 percent but ranges to as much as 15 percent. Soils of the Sallisaw series are fine-loamy, siliceous, thermic Typic Paleudalfs.

Sallisaw soils are on the same landscape as Stigler and Wetsaw soils. Stigler soils are in lower positions, have a fine control section, and are moderately well drained. Wetsaw soils are in lower positions, are moderately well drained, and have a seasonal perched high water table.

Typical pedon of Sallisaw loam, 1 to 3 percent slopes, in a pasture, 1,500 feet south and 1,324 feet east of the northwest corner of sec. 5, T. 7 N., R. 24 E.

Ap—0 to 7 inches; reddish brown (5YR 4/4) loam; weak fine granular structure; friable; slightly acid; gradual smooth boundary.

B1—7 to 14 inches; red (2.5YR 4/6) loam; weak fine granular structure; friable; medium acid; gradual smooth boundary.

B2t—14 to 42 inches; red (2.5YR 4/8) clay loam; weak fine subangular blocky structure; friable; clay films on faces of peds; 5 percent gravel, by volume; few fine black concretions; medium acid; clear irregular boundary.

IIB3—42 to 62 inches; yellowish red (5YR 4/6) very gravelly clay loam; massive; firm; patchy clay films on faces of peds; 60 percent sandstone gravel, by volume; few fine black concretions; strongly acid.

Solum thickness is more than 60 inches. Depth to the IIB3 horizon is 30 to 60 inches. Reaction is medium acid or slightly acid in the A horizon and strongly acid or medium acid in the B horizon. In the A horizon, sandstone gravel ranges from 0 to 20 percent, by volume; sandstone cobbles and stones each range from 0 to 15 percent. In the B1 and B2t horizons, sandstone gravel ranges from 0 to 35 percent, by volume. Total

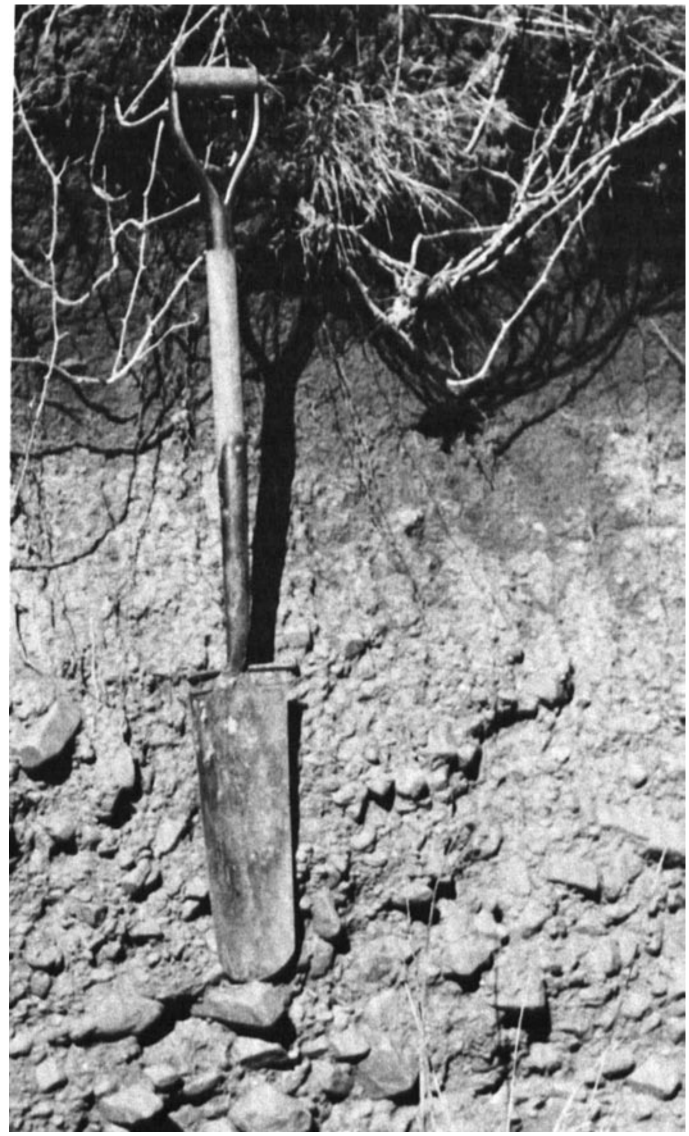


Figure 14.—Profile of Sallisaw loam, 1 to 3 percent slopes, showing the loamy A horizon and upper part of the B horizon and the very gravelly IIB3 horizon.

coarse fragments in the IIB3 horizon range from 35 to 85 percent. Sandstone gravel ranges from 35 to 70 percent, sandstone cobbles range from 0 to 15 percent, and stones range from 0 to 5 percent.

The A horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 2 to 4. It is loam or stony loam. The content of gravel is high in the A horizon in pedons that are stony.

The B1 horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is loam or gravelly loam.

The B2t horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 6 or 8. It is sandy clay loam, gravelly

sandy clay loam, clay loam, or gravelly clay loam. There are a few black concretions in some pedons.

The IIB3 horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 6 or 8. It is gravelly sandy clay loam, very gravelly sandy clay loam, gravelly clay loam, or very gravelly clay loam. Few to common black concretions are in some pedons.

Soils that are similar to Sallisaw soils except that they have a depth of 26 to 30 inches or 60 to 70 inches to the IIB3 horizon were considered Sallisaw soils in naming the map units. Their behavior is essentially like that of the Sallisaw soils.

Severn series

The Severn series consists of deep, well drained, moderately rapidly permeable soils that formed in stratified, loamy, calcareous alluvium partly of Permian red bed origin. These nearly level to gently undulating soils are on the flood plain of the Arkansas River. Most areas have been mechanically smoothed. However, some areas of soils that have not been reworked are gently undulating. Slopes dominantly are less than 1 percent but range to 3 percent along the short irregular slopes in undulating areas. Soils of the Severn series are coarse-silty, mixed (calcareous), thermic Typic Udifluvents.

Severn soils are on the same landscapes as Kiomatia, Norwood, and Oklared soils. These associated soils commonly are in lower lying positions. Kiomatia soils have a sandy control section, Norwood soils have a fine-silty control section, and Oklared soils have a coarse-loamy control section.

Typical pedon of Severn very fine sandy loam, rarely flooded, in a field, 2,200 feet south and 700 feet west of the northeast corner of sec. 5, T. 9 N., R. 25 E.

Ap—0 to 9 inches; dark brown (7.5YR 3/4) very fine sandy loam; weak fine granular structure; very friable; calcareous; moderately alkaline; clear smooth boundary.

C1—9 to 49 inches; brown (7.5YR 5/4) very fine sandy loam; massive; very friable; distinct bedding planes; few thin strata of silt loam; calcareous; moderately alkaline; abrupt wavy boundary.

IIC2—49 to 64 inches; reddish brown (5YR 4/3) silty clay; massive; firm; calcareous; moderately alkaline; abrupt wavy boundary.

IIIC3—64 to 84 inches; brown (7.5YR 5/4) very fine sandy loam; massive; very friable; bedding planes present; common thin strata of silt loam and silty clay; calcareous; moderately alkaline.

Bedding planes are present in the control section. The Ap horizon is neutral to moderately alkaline and generally is calcareous. The C horizon is moderately alkaline and calcareous.

The Ap horizon has hue of 5YR or 7.5YR, value of 3 or 4, and chroma of 3 or 4. It is dominantly very fine sandy loam, but it ranges to loam and silt loam.

The C horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is dominantly very fine sandy loam, but it has thin strata of silt loam and fine sandy loam. In places the lower part of the C horizon has thin strata of coarser or finer textured material.

Sherless series

The Sherless series consists of moderately deep, well drained, moderately permeable soils that formed in material weathered from sandstone. These gently sloping to moderately steep soils are on ridgetops and side slopes of uplands in the valleys of the Ouachita Mountains. Slopes range from 3 to 15 percent. Soils of the Sherless series are fine-loamy, mixed, thermic Typic Hapludults.

Sherless soils are associated with Bengal and Wetsaw soils. Bengal soils are in the same position as Sherless soils but have a clayey control section. Wetsaw soils are on alluvial benches and stream terraces, and the solum thickness is more than 60 inches.

Typical pedon of Sherless gravelly fine sandy loam in an area of Sherless-Bengal complex, 3 to 15 percent slopes, in woodland, 1,900 feet north and 300 feet west of the southeast corner of sec. 24, T. 1 N., R. 24 E.

A1—0 to 5 inches; very dark grayish brown (10YR 3/2) gravelly fine sandy loam; weak fine granular structure; friable; many fine and medium roots and few coarse roots; gravel makes up 15 percent of the volume; medium acid; clear wavy boundary.

A2—5 to 11 inches; yellowish brown (10YR 5/6) gravelly fine sandy loam; weak fine granular structure; friable; common fine roots, many medium roots, and few coarse roots; gravel makes up 15 percent of the volume; medium acid; clear wavy boundary.

B21t—11 to 22 inches; yellowish red (5YR 5/8) gravelly clay loam; weak fine subangular blocky structure; friable; discontinuous clay films on faces of peds; gravel makes up 10 percent of the volume, and cobbles make up 5 percent; few fine roots, many medium roots, and few coarse roots; strongly acid; gradual wavy boundary.

B22t—22 to 32 inches; strong brown (7.5YR 5/8) gravelly clay loam; many fine distinct red (2.5YR 4/8) mottles; weak fine subangular blocky structure; friable; discontinuous clay films on faces of peds; gravel makes up 10 percent of the volume, and cobbles make up 5 percent; common medium roots and few coarse roots; very strongly acid; clear irregular boundary.

Cr—32 to 40 inches; fractured soft sandstone in shades of brown, red, and gray.

Solum thickness ranges from 20 to 40 inches. Reaction ranges from very strongly acid to neutral in the A1 horizon and from very strongly acid to medium acid in the A2 horizon; it is very strongly acid or strongly acid in the B horizon. Sandstone gravel ranges from 5 to 20 percent by volume throughout the solum. Sandstone cobbles make up 0 to 20 percent of the volume in the A horizon and 0 to 15 percent in the B horizon.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 3. It is dominantly gravelly fine sandy loam, but it ranges to stony fine sandy loam and cobbly fine sandy loam. The A2 horizon has hue of 10YR, value of 5 to 7, and chroma of 4 to 6. It is gravelly fine sandy loam, cobbly fine sandy loam, or fine sandy loam.

The B1 horizon, where present, has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 or 8. It is fine sandy loam, loam, or the gravelly or cobbly counterparts.

The B2t horizon has hue of 5YR or 7.5YR, value of 5 or 6, and chroma of 6 to 8. Mottles in shades of red and brown range from none to many in the lower part of the B2t horizon. Texture is clay loam, sandy clay loam, gravelly clay loam, cobbly clay loam, cobbly sandy clay loam, or gravelly sandy clay loam.

Soils that are similar to Sherless soils except that they have a solum ranging from 40 to 55 inches in thickness over sandstone or shale were considered Sherless soils in naming the map units. Their behavior is essentially like that of the Sherless soils.

Shermore series

The Shermore series consists of deep, moderately well drained, moderately slowly permeable soils that formed in colluvium weathered from interbedded sandstone and shale. These very gently sloping to sloping soils are on foot slopes and alluvial fans of adjacent steeper uplands. Slopes range from 1 to 8 percent. A perched high water table is 1 1/2 to 3 1/2 feet below the surface during winter and spring. Soils of the Shermore series are fine-loamy, siliceous, thermic Typic Fragiudalfs.

Shermore soils are associated with Bengal, Kamie, McKamie, and Stigler soils. Bengal soils are on higher lying, convex ridges and have a clayey control section. Kamie and McKamie soils are intermingled with Shermore soils on terraces, but they do not have a fragipan. Stigler soils are in valleys adjacent to and downslope from the Shermore soils, and they have a fine control section.

Typical pedon of Shermore fine sandy loam, 2 to 5 percent slopes, eroded, in a pasture 3 miles southwest of Bokoshe, 500 feet north and 2,340 feet east of the southwest corner of the northwest quarter of sec. 14, T. 8 N., R. 23 E.

Ap—0 to 7 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; friable; sandstone gravel makes up 5 percent of the volume; few fine yellowish brown and black concretions; medium acid; clear wavy boundary.

B1—7 to 13 inches; strong brown (7.5YR 5/6) loam; weak fine granular structure; friable; sandstone gravel makes up 5 percent of the volume; few fine yellowish brown and black concretions; medium acid; gradual smooth boundary.

B2t—13 to 31 inches; strong brown (7.5YR 5/8) loam; weak fine subangular blocky structure; friable; patchy clay films on faces of peds; common fine red and black concretions; strongly acid; clear wavy boundary.

Bx1—31 to 58 inches; coarsely mottled strong brown (7.5YR 5/6), red (2.5YR 4/6), and gray (10YR 6/1) clay loam; gray vertical streaks 1/4 to 1/2 inch wide and generally more clayey than the surrounding soil; coarse prismatic structure parting to weak fine subangular blocky; slightly brittle; patchy clay films on faces of peds; common fine red and black concretions; very strongly acid; gradual wavy boundary.

Bx2—58 to 80 inches; yellowish brown (10YR 5/4) clay loam; few fine distinct red (2.5YR 4/6) mottles and common gray (10YR 6/1) vertical streaks; weak fine subangular blocky structure; slightly brittle; patchy clay films on faces of peds; common fine red and black concretions; strongly acid.

Solum thickness is 60 inches or more. A fragipan is 20 to 40 inches below the surface. Reaction ranges from strongly acid to medium acid in the Ap horizon and from very strongly acid to medium acid in the B1 horizon; it is very strongly acid or strongly acid in the B2t and Bx horizons. Yellowish brown, red, and black concretions range from few to common throughout the solum.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. It is dominantly fine sandy loam, but it ranges to loam. Sandstone gravel makes up 0 to 15 percent by volume in the A and B1 horizons. The A2 horizon, where present, has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 or 6. It is fine sandy loam or loam and is 2 to 6 inches thick.

The B1 horizon, where present, has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 6 or 8. It is fine sandy loam or loam.

The B2t horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 6 or 8. It is loam, fine sandy loam, clay loam, or sandy clay loam.

The Bx horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8 and has few to common mottles in shades of red and gray or is coarsely mottled in shades of red, brown, and gray. It is sandy clay loam or clay loam. Some gray areas are clay; however, the average clay content of the horizon is 20 to 35 percent.

The B3 horizon, where present, is mottled in hue of 7.5YR and 10YR, value of 5 to 7, and chroma of 1 or 2 and 6 to 8. It is loam, sandy clay loam, or clay loam.

Speer series

The Speer series consists of deep, well drained, moderately permeable soils that formed in loamy sediment on flood plains. Slopes are nearly level to undulating and range from 0 to 3 percent. Soils of the Speer series are fine-loamy, siliceous, thermic Ultic Hapludalfs.

Speer soils are on the same landscape as Ceda, Kenn, Neff, and Rexor soils. Ceda and Kenn soils commonly are upstream. Ceda soils are loamy-skeletal, and Kenn soils have a gravelly layer at a depth of 20 to 40 inches. Neff soils are in depressions, have a fine-silty control section, and have gray mottles in the upper part of the argillic horizon. Rexor soils are in the same landscape position as Speer soils, but they have a fine-silty control section.

Typical pedon of Speer fine sandy loam, in an area of Speer-Neff association, occasionally flooded, undulating, in a pasture, 1,600 feet north and 300 feet west of the southeast corner of sec. 32, T. 3 N., R. 24 E.

A11—0 to 3 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable; neutral; clear smooth boundary.

A12—3 to 7 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; friable; slightly acid; clear smooth boundary.

B1—7 to 11 inches; brown (7.5YR 4/4) loam; weak fine granular structure; friable; medium acid; gradual smooth boundary.

B21t—11 to 34 inches; yellowish red (5YR 4/6) clay loam; weak fine subangular blocky structure; friable; patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.

B22t—34 to 46 inches; yellowish red (5YR 4/6) clay loam; common fine very pale brown mottles; weak fine subangular blocky structure; friable; patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.

C—46 to 63 inches; brown (7.5YR 4/4) fine sandy loam; common fine light brownish gray and pale brown mottles; massive; friable; very strongly acid.

Solum thickness ranges from 40 to 60 inches or more. Reaction ranges from strongly acid to neutral in the A horizon and from very strongly acid to medium acid in the B horizon; it is very strongly acid or strongly acid in the C horizon. Sandstone gravel ranges from 0 to 10 percent, by volume, in the C horizon.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4; or it has hue of 7.5YR, value of 4, and chroma of 2 or 4 or value of 5 and chroma of 4 or 6. Texture is fine sandy loam or loam.

The B1 horizon, where present, has hue of 7.5YR, value of 4 or 5, and chroma of 4 or 6. It is fine sandy loam or loam.

The B2t horizon has hue of 5YR or 7.5YR, value of 3 to 5, and chroma of 4 to 8. It is clay loam or sandy clay loam. In places the lower part of the B2t horizon has few to common fine pale brown and very pale brown mottles.

The B3 horizon, where present, is 10 to 26 inches thick and has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is loam or fine sandy loam.

The C horizon has hue of 5YR to 10YR, value of 4 to 7, and chroma of 2 to 6. It is fine sandy loam or loam. Gray and brown mottles and brownish yellow concretions range from none to common.

Soils that are similar to Speer soils except that they have 15 to 18 percent clay in the control section, similar soils that have a gravelly C horizon, and similar soils that do not decrease in clay content within 60 inches of the surface were considered Speer soils in naming the map units. Their behavior is essentially like that of the Speer soils.

Stigler series

The Stigler series consists of deep, moderately well drained, very slowly permeable soils that formed on uplands in old alluvium or in material that weathered from shale. These nearly level to very gently sloping soils are in broad, gently rolling areas as well as in narrow valleys. Slopes range from 0 to 3 percent. A perched water table is 2 to 3 feet below the surface during winter and spring. Soils of the Stigler series are fine, mixed, thermic Aquic Paleudalfs.

Stigler soils are on the same landscape as Cowton, Sallisaw, Shermore, Vian, Wing, and Wister soils. Cowton soils are on convex slopes and have shale within 40 inches of the surface. Sallisaw and Shermore soils are in higher positions. Sallisaw soils have gravel, and Shermore soils have a fragipan. Vian soils are on convex slopes and have a fine-silty control section. Wing soils commonly are adjacent to drainageways and have a high content of sodium in the subsoil. Wister soils are in the same position as Stigler soils but are 40 to 60 inches thick over shale.

Typical pedon of Stigler silt loam, 1 to 3 percent slopes, in a native grass hay meadow, 50 feet north and 2,650 feet east of the southwest corner of sec. 5, T. 9 N., R. 24 E.

A1—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; strongly acid; gradual smooth boundary.

A2—10 to 22 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; friable; very strongly acid; clear wavy boundary.

B21t—22 to 40 inches; yellowish brown (10YR 5/4) silty clay; common fine distinct red mottles and few fine distinct grayish brown mottles; weak fine blocky structure; firm; many clay films on faces of peds; few

fine red and black concretions; strongly acid; gradual wavy boundary.

B22t—40 to 71 inches; mottled yellowish brown (10YR 5/6) and gray (10YR 6/1) silty clay; weak fine blocky structure; firm; many clay films on faces of peds; common fine red and black concretions; medium acid.

Solum thickness is 60 to 80 inches. Reaction is very strongly acid or strongly acid in the A1 and A2 horizons and ranges from very strongly acid to medium acid in the B21t horizon and from strongly acid to mildly alkaline in the B22t horizon.

The thickness of the A horizon ranges from 16 to 30 inches. The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3; and the A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 4.

The B21t horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. Fine or medium mottles in shades of red, brown, or gray range from few to many. The B22t horizon is coarsely mottled in hue of 10YR, value of 5 or 6, and chroma of 1 to 8. The B2t horizon is silty clay loam or silty clay. The clay content is 35 to 50 percent. Fine and medium red and black concretions range from none to many throughout.

Soils that are similar to Stigler soils except that they have an A horizon that is 13 to 16 inches thick and other soils that are similar except that they are gray in the upper 3 to 15 inches of their B2t horizon were considered Stigler soils in naming the map units. Their behavior is essentially like that of the Stigler soils.

Tuskahoma series

The Tuskahoma series consists of shallow, moderately well drained, very slowly permeable soils that formed in material weathered from shale. These very gently sloping to moderately steep soils are on low ridges, primarily in the broad valleys in the southern part of the county. They are droughty during the dry summer months. Slopes range from 2 to 15 percent. These soils have a perched water table 1/2 foot to 1 1/2 feet below the surface during winter and spring. Soils of the Tuskahoma series are clayey, mixed, thermic, shallow Albaquic Hapludalfs.

Tuskahoma soils are on the same landscape as Bengal, Wing, and Wister soils. Bengal soils are on low ridges and are 20 to 40 inches thick over shale. Wing and Wister soils are on concave slopes in the valleys. Wing soils are adjacent to small streams, are more than 40 inches thick over shale, and have a high content of sodium in the argillic horizon. Wister soils are 40 to 60 inches thick over shale.

Typical pedon of Tuskahoma stony loam, 2 to 15 percent slopes, in a pasture about 2 miles east of Talihina, 1,250 feet east and 975 feet north of the southwest corner of sec. 5, T. 3 N., R. 22 E.

A1—0 to 5 inches; dark grayish brown (10YR 4/2) stony loam; moderate fine granular structure; friable; fragments of sandstone make up 15 percent of the volume; medium acid; abrupt smooth boundary.

B2t—5 to 10 inches; brown (10YR 4/3) clay; many fine distinct yellowish red mottles and few fine faint dark grayish brown mottles; moderate medium blocky structure; firm; continuous clay films on faces of peds; few fine fragments of shale; medium acid; gradual wavy boundary.

B3—10 to 15 inches; dark gray (10YR 4/1) shaly clay; common fine distinct yellowish red mottles; weak medium blocky structure; firm; thin patchy clay films on faces of peds; fragments of shale make up 25 percent of the volume; medium acid; gradual irregular boundary.

Cr—15 to 30 inches; gray (10YR 5/1) soft shale bedrock that has thin layers of shaly clay; tilted 40 degrees from horizontal; neutral.

Solum thickness and depth to shale bedrock are 10 to 20 inches. Reaction ranges from medium acid to mildly alkaline in the A1 and B3 horizons, from strongly acid to neutral in the B2t horizon, and from slightly acid to moderately alkaline in the Cr horizon.

The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. It is loam or stony loam. Sandstone fragments make up 15 to 30 percent of the volume. Sandstone gravel makes up 5 to 10 percent, and sandstone cobbles and stones make up 10 to 20 percent.

The B2t horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 6 and has few to many mottles in shades of gray and red, brown, or yellow. It is clay, silty clay, shaly clay, or shaly silty clay. Fragments of shale less than 76 millimeters in diameter make up 0 to 30 percent of the volume.

The B3 horizon, where present, has hue of 10YR, value of 4 or 5, and chroma of 1 or 2 and has few to many mottles in shades of gray, brown, or red. It is very shaly clay, very shaly silty clay, shaly clay, or shaly silty clay. Fragments of shale less than 76 millimeters in diameter make up 20 to 50 percent of the volume.

The Cr horizon is gray or olive gray shale bedrock that is soft in the upper part and becomes harder as depth increases. Tilt of the shale beds is more than 20 degrees from horizontal. In some areas the shale has thin layers of shaly clay.

Soils that are similar to Tuskahoma soils except that they are 20 to 24 inches thick were considered Tuskahoma soils in naming the map units. Their behavior is essentially like that of the Tuskahoma soils.

Vian series

The Vian series consists of deep, moderately well drained, moderately slowly permeable soils that formed

on uplands in old alluvium or material weathered from shale. These very gently sloping to gently sloping soils are in broad, rolling areas in the northern part of the county. Slopes range from 1 to 5 percent. A perched water table is 2 to 3 feet below the surface during winter and early in spring. Soils of the Vian series are fine-silty, siliceous, thermic Aquic Paleudalfs.

Vian soils are on the same landscape as Cowton, Stigler, and Wing soils. Cowton soils are in similar positions or on higher convex slopes. These soils have a clayey control section and have shale within a depth of 40 inches. Stigler soils are generally on lower slopes and have a clayey control section. Wing soils commonly are adjacent to drainageways and have a high content of sodium in the subsoil.

Typical pedon of Vian silt loam, 1 to 3 percent slopes, in a native grass hay meadow, 800 feet south and 40 feet west of the northeast corner of sec. 27, T. 9 N., R. 25 E.

A1—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; medium acid; gradual smooth boundary.

A2—10 to 18 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; strongly acid; gradual smooth boundary.

B1—18 to 23 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; friable; strongly acid; clear smooth boundary.

B21t—23 to 44 inches; yellowish brown (10YR 5/6) silty clay loam; common coarse distinct gray, pale brown, and red mottles; weak fine subangular blocky structure; friable; patchy clay films on faces of peds; common fine red and black concretions; strongly acid; diffuse smooth boundary.

B22t—44 to 65 inches; mottled yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) silty clay loam; few fine distinct red mottles; weak fine subangular blocky structure; friable; patchy clay films on faces of peds; common fine red and black concretions; strongly acid.

Solum thickness is 60 inches or more. Reaction is strongly acid or medium acid in the A1 horizon, ranges from very strongly acid to medium acid in the A2 horizon, and is very strongly acid or strongly acid in the B horizon.

The A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The A horizon dominantly is silt loam, but it ranges to loam. The A2 horizon has hue of 10YR with value of 5 or 6 and chroma of 2 or 3 or with value of 5 and chroma of 4. The thickness of the A horizon ranges from 16 to 30 inches.

The B1 horizon or B21t horizon has hue of 7.5YR or 10YR with value of 5 or 6 and chroma of 4 to 8 or with value of 4 and chroma of 4. Fine or medium mottles in shades of gray and brown or red range from few to many in the B21t horizon. The B1 horizon is silt loam or silty clay loam. The B2t horizon is silty clay loam or clay loam, and it is 27 to 35 percent clay. Fine and medium red and black concretions range from none to many throughout.

The B22t horizon is coarsely mottled in hue of 7.5YR or 10YR, value of 5 to 8, and chroma of 1 to 8. Fine distinct red mottles range from few to common.

Soils that are similar to Vian soils except that they have a yellowish red B21t horizon were considered Vian soils in naming the map units. Their behavior is essentially like that of the Vian soils.

Wabbaseka series

The Wabbaseka series consists of deep, moderately well drained, very slowly permeable soils that formed in clayey alluvium over loamy alluvium partly of Permian red bed origin. These nearly level to very gently undulating soils are on the flood plain of the Arkansas River. Slopes dominantly are less than 1 percent but range from 0 to 2 percent. Soils of the Wabbaseka series are clayey over loamy, mixed, thermic Fluventic Hapludolls.

Wabbaseka soils are on the same landscape as Latanier, Lynnville Variant, and Oklared soils. Latanier soils have thicker clayey layers and are in slightly lower lying positions. The gently undulating to concave Lynnville Variant soils have a fine-silty control section. Oklared soils are in higher positions and have a coarse-loamy control section.

Typical pedon of Wabbaseka silty clay, rarely flooded, in a cultivated field, 2,000 feet south and 1,300 feet east of the northwest corner of sec. 31, T. 10 N., R. 27 E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silty clay; weak fine blocky structure; very firm; mildly alkaline; clear smooth boundary.

B2—6 to 18 inches; dark reddish brown (5YR 3/3) silty clay; weak medium blocky structure; very firm; mildly alkaline; abrupt wavy boundary.

IIC1—18 to 22 inches; brown (7.5YR 4/4) very fine sandy loam; massive; very friable; bedding planes present; mildly alkaline; abrupt wavy boundary.

IIC2—22 to 32 inches; brown (7.5YR 4/4) silt loam; massive; friable; mildly alkaline; abrupt wavy boundary.

IIC3—32 to 45 inches; brown (7.5YR 5/4) fine sandy loam; massive; very friable; bedding planes present; mildly alkaline; abrupt wavy boundary.

IIC4—45 to 51 inches; brown (7.5YR 4/4) silty clay loam massive; friable; 40 percent is strata of brown silt loam; mildly alkaline; abrupt wavy boundary.

IIC5—51 to 61 inches; brown (7.5YR 5/4) fine sandy loam; massive; very friable; bedding planes present; mildly alkaline.

Depth to contrasting texture ranges from 12 to 20 inches. Reaction is neutral or mildly alkaline throughout.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 2 or 3. Texture is clay or silty clay.

The B horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 or 3; or it has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. Texture is clay or silty clay.

The IIC horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. Texture is silt loam, fine sandy loam, very fine sandy loam, loam, loamy fine sand, or loamy sand. Bedding planes are present in some horizons. In places strata of silty clay loam are below a depth of 40 inches.

Soils that are similar to Wabbaseka soils except that colors (5YR 3/4 and 5YR 4/3) in the surface layer differ and other similar soils that are calcareous throughout the solum were considered Wabbaseka soils in naming the map units. Their behavior is essentially like that of the Wabbaseka soils.

Wetsaw series

The Wetsaw series consists of deep, moderately well drained, slowly permeable soils that formed in loamy and gravelly alluvium over clay. The clay formed in deposits that weathered from shale. These very gently sloping to gently sloping soils are on alluvial benches and stream terraces in valleys of the Ouachita Mountains. Slopes range from 1 to 5 percent. An apparent high water table is at a depth of 1/2 foot to 2 1/2 feet during winter and spring. Soils of the Wetsaw series are fine-loamy, siliceous, thermic Aquic Paleudalfs.

Wetsaw soils are on the same landscape as Bengal, Sallisaw, and Sherless soils. Bengal and Sherless soils are in steeper, higher positions. Bengal soils have a clayey control section. Sallisaw soils are in slightly higher lying positions and do not have a perched high water table. Sherless soils have a fine-loamy control section and have sandstone bedrock at a depth of 20 to 40 inches.

Typical pedon of Wetsaw fine sandy loam, 1 to 3 percent slopes, in a forest, about 2 1/2 miles west of Muse, 1,330 feet east and 2,350 feet north of the southwest corner of sec. 5, T. 2 N., R. 24 E.

A1—0 to 6 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; friable; strongly acid; clear wavy boundary.

A2—6 to 10 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; friable; strongly acid; clear wavy boundary.

B21t—10 to 23 inches; strong brown (7.5YR 5/6) clay loam; weak fine subangular blocky structure; friable; patchy clay films on faces of peds; gravel makes up 3 percent of the volume; very strongly acid; gradual smooth boundary.

B22t—23 to 33 inches; strong brown (7.5YR 5/6) loam; common fine distinct gray and red mottles; weak fine subangular blocky structure; friable; patchy clay films on faces of peds; gravel makes up 5 percent of the volume; very strongly acid; gradual wavy boundary.

IIB23t—33 to 48 inches; mottled gray (10YR 6/1), brownish yellow (10YR 6/8), and red (2.5YR 4/8) very gravelly clay; weak fine subangular blocky structure; friable; patchy clay films on faces of peds; gravel makes up 60 percent of the volume; very strongly acid; gradual wavy boundary.

IIIB24t—48 to 65 inches; mottled yellowish brown (10YR 5/8), light gray (10YR 7/1), and red (10R 4/6) clay; weak fine blocky structure; firm; patchy clay films on faces of peds; gravel makes up 3 percent of the volume; very strongly acid.

Solum thickness is 60 inches or more. Depth to the gravelly IIB2t horizon ranges from 26 to 60 inches. Reaction ranges from slightly acid to strongly acid in the A horizon and is strongly acid or very strongly acid in the B1, B2t, IIB2t, and IIIB2t horizons. Sandstone gravel ranges from 0 to 10 percent, by volume, in the A, B1, B2t, and IIIB2t horizons and from 20 to 70 percent in the IIB2t horizon. Sandstone cobbles range from 0 to 5 percent in the A, B1, B2t, and IIIB2t horizons and from 0 to 20 percent in the IIB2t horizon.

The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. The A2 horizon, where present, has hue of 10YR, value of 5 or 6, and chroma of 4 to 6. The A horizon is fine sandy loam or loam.

The B1 horizon, where present, is 4 to 8 inches thick and has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6. It is loam or fine sandy loam.

The B21t horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8. It is loam, clay loam, or sandy clay loam and is 20 to 35 percent clay. The B22t horizon has the same color and texture range as the B2lt horizon and has mottles of chroma 1 or 2.

The IIB23t horizon is mottled in shades of gray, yellow, brown, or red. In places, it has hue of 7.5YR, value of 5, and chroma of 6 to 8 and has few to common mottles of chroma 1 or 2. It is gravelly clay, gravelly clay loam, gravelly sandy clay loam, very gravelly clay, very gravelly clay loam, or very gravelly sandy clay loam.

The IIIB24t horizon is coarsely mottled in shades of brown, gray, and red. It is clay or silty clay.

Soils that are similar to Wetsaw soils except that they have a gravelly layer at a depth of 60 inches or more and other similar soils that have gray mottles below a depth of 30 to 36 inches were considered Wetsaw soils in naming the map units. Their behavior is essentially like that of the Wetsaw soils.

Wing series

The Wing series consists of deep, moderately well drained, very slowly permeable soils that formed on uplands in old alluvium or in material that weathered

from shale. They have a high content of sodium in the subsoil. These nearly level to very gently sloping soils commonly are adjacent to small drainageways. Slopes range from 0 to 2 percent. A perched water table is at a depth of 1/2 to 1 foot during winter and spring. Soils of the Wing series are fine, mixed, thermic Aquic Natrustalfs.

Wing soils are on the same landscape as Cowton, Stigler, Tuskahoma, Vian, and Wister soils. These associated soils are in higher positions, and they do not have a high content of sodium in the subsoil.

Typical pedon of Wing silt loam, 0 to 2 percent slopes, in a pasture, 1,375 feet north and 250 feet east of the southwest corner of sec. 16, T.9 N., R. 24 E.

A1—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; massive; friable; medium acid; abrupt smooth boundary.

B21t—6 to 16 inches; dark yellowish brown (10YR 4/4) clay; few fine distinct dark grayish brown mottles; weak medium columnar structure breaking to weak medium blocky; very firm; dark grayish brown coatings on faces of some peds; many clay films on faces of peds; brown silt coatings along faces of some structure columns; slightly acid; gradual smooth boundary.

B22t—16 to 29 inches; dark yellowish brown (10YR 4/4) clay; few fine distinct dark grayish brown mottles; weak medium and fine blocky structure; very firm; many clay films on faces of peds; moderately alkaline; clear smooth boundary.

B23t—29 to 41 inches; dark yellowish brown (10YR 4/6) clay; common fine distinct light gray mottles; weak fine blocky structure; very firm; common fine red and black concretions; clay films on faces of peds; moderately alkaline; gradual smooth boundary.

B24t—41 to 56 inches; yellowish brown (10YR 5/6) clay; common fine distinct light gray mottles; weak fine blocky structure; very firm; common fine red and black concretions; few fine calcium carbonate concretions; clay films on faces of peds; moderately alkaline; gradual smooth boundary.

C—56 to 70 inches; mottled yellowish brown (10YR 5/8) and gray (10YR 5/1) clay; massive; firm; sandstone fragments make up 10 percent of the volume; few medium soft fragments of shale; few fine calcium carbonate concretions; patchy clay films on faces of peds; moderately alkaline.

Reaction is strongly acid or medium acid in the A1 horizon and ranges from strongly acid to neutral in the B21t horizon. It ranges from medium acid to moderately alkaline in the B22t and B23t horizons and is moderately alkaline in the B24t and C horizons.

The A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The B1 horizon, where present, is 3 to 6 inches thick and has hue of 10YR, value of 4 or 5, and chroma of 3.

The B2t horizon has hue of 10YR with value of 4 and chroma of 2 to 6 or with value of 5 and chroma of 4 to 8. Fine or medium mottles in shades of gray and red or brown range from few to common. This horizon is clay, silty clay, clay loam, or silty clay loam, and the clay content is 35 to 60 percent. Fine and medium red and black concretions range from none to many throughout. In places, the lower part of the B2t horizon has a few calcium carbonate concretions or salt crystals, or both. Exchangeable sodium ranges from 15 to 45 percent.

The C horizon has mottles in hue of 10YR, value of 5 to 7, and chroma of 1 to 8, or has colors similar to those of the B2t horizon. It is clay, silty clay, clay loam, or silty clay loam; the content of clay is 35 to 60 percent. Small fragments of shale and sandstone gravel make up 0 to 15 percent of the volume. Exchangeable sodium ranges from 15 to 40 percent.

Soils that are similar to Wing soils except that they do not have gray mottles in the upper part of the B2t horizon and other similar soils that have shale at a depth of 40 to 60 inches were considered Wing soils in naming the map units. Their behavior is essentially like that of the Wing soils.

Wister series

The Wister series consists of deep, moderately well drained, very slowly permeable soils that formed in material weathered from shale. These nearly level to gently sloping soils are on uplands. Slopes dominantly are 1 to 3 percent but range from 0 to 5 percent. A perched water table is at a depth of 1 foot to 2 feet in the winter and spring. Soils of the Wister series are fine, mixed, thermic Albaquic Hapludalfs.

Wister soils are on the same landscape as Cowton, Stigler, Tuskahoma, and Wing soils. Cowton and Tuskahoma soils are on higher lying, convex ridges and are less than 40 inches thick over shale. Stigler soils are in the same positions as Wister soils but are more than 60 inches thick over shale. Wing soils are adjacent to small drainageways and have a high content of sodium in the subsoil.

Typical pedon of Wister silt loam, 0 to 1 percent slopes, in a pasture, about 1 mile south of Cameron, 400 feet west and 2,500 feet north of the southeast corner of sec. 34, T. 8 N., R. 26 E.

A1—0 to 8 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; few fine black and yellowish brown concretions; strongly acid; clear smooth boundary.

A2—8 to 15 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; few fine black and yellowish brown concretions; strongly acid; clear wavy boundary.

B21t—15 to 34 inches; dark yellowish brown (10YR 4/4) silty clay; few medium prominent red (2.5YR 4/6)

and common medium distinct gray (10YR 6/1) mottles; weak fine blocky structure; firm; common black concretions; continuous clay films on faces of peds; strongly acid; gradual wavy boundary.

B22t—34 to 53 inches; mottled yellowish brown (10YR 5/6) and gray (10YR 6/1) silty clay; weak fine blocky structure; firm; continuous clay films on faces of peds; medium acid; clear irregular boundary.

Cr—53 to 64 inches; gray (10YR 6/1) shale; medium acid.

Solum thickness ranges from 40 to 60 inches. Reaction ranges from very strongly acid to medium acid in A and B21t horizons and from strongly acid to moderately alkaline in the B22t and Cr horizons. Fine black and yellowish brown concretions range from none to common throughout the solum.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. The boundary into the B21t horizon is clear or abrupt; there is an abrupt textural change. In places, there is as much as 15 percent interfingering of the A2 horizon into the upper 1 to 3 inches of the B21t horizon.

The B2t horizon has hue of 10YR, value of 4 or 5, and chroma of 4 or 6. The B21t horizon has few to common red, brown, or gray mottles. The B22t horizon also has a mottled matrix in shades of brown, gray, or yellow. It is clay or silty clay.

The thin B3 horizon, where present, is similar in color, texture, and reaction to the B22t horizon but has 5 to 15 percent waterworn gravel or shale fragments.

The Cr horizon is gray or gray and brown soft shale that increases in hardness as depth increases.

Soils that are similar to Wister soils except that they have shale at a depth of 30 to 40 inches were considered Wister soils in naming the map units. Their behavior is essentially like that of the Wister soils.

Formation of the soils

Soil is produced by the action of soil-forming processes on materials deposited or accumulated by geologic agencies. The characteristics of the soil at any given point are determined by (1) the physical and mineral composition of the parent material and the tilt of the bedrock, (2) the climate under which the soil material has accumulated and has existed since accumulation, (3) the plant and animal life on and in the soil, (4) the relief or lay of the land, and (5) the length of time the forces of soil development have acted on the parent material. Few generalizations can be made regarding the effects of any one factor because the effects of each are modified by the other four. However, if a given factor, vegetation for example, differs significantly from one area to another, the soils that form in the two areas will be different.

Parent material

Soils formed in unconsolidated material. The kind of material influences the rate at which the soil forms; the chemical, physical, and mineral composition of the soil; and the color of the soil.

Soils on the uplands of LeFlore County formed in material that weathered from sandstone and shale, in colluvium, and in clayey, gravelly, and loamy alluvium. Clebit, Pirum, and Sherless soils formed in material that weathered from sandstone. Carnasaw and Wister soils formed in material that weathered from shale. Caston soils formed in material that weathered from colluvium, and Kamie and McKamie soils formed in older loamy and clayey alluvium.

Recent alluvium is extensive along streams and rivers of the county. The kind of sediment deposited, and the kinds of soil that formed in it, depend largely on the source of the sediment and the velocity of the floodwaters. Crevasse and Kiomatia soils formed in sandy sediment deposited near streambeds when the streams overflowed. Norwood and Neff soils formed in loamy sediment, and Moreland and Lela soils formed in clayey sediment that was deposited on flood plains by slow-moving water farther from the streambed.

Climate

LeFlore County has a warm, temperate climate. The climate is fairly uniform throughout the county except in the extreme southern part, which has higher annual precipitation than the rest of the county. Moisture and warm temperatures have been sufficient to promote the formation of distinct layers in many of the soils. Soil leaching is promoted because of adequate precipitation.

Plants and animals

Plants, burrowing animals, insects, and soil micro-organisms have a direct influence on the formation of soils. The native grasses and the trees of the county have had different effects on the losses and gains of organic matter and plant nutrients and on soil structure and porosity. Vian soils formed under savannah vegetation and are high in organic matter content. Pirum soils formed under trees and are low in organic matter content.

Relief

Relief affects the formation of soils mainly through its influence on water movement, erosion, soil temperature, and the kind of plant cover. In LeFlore County, relief is determined largely by the resistance to weathering of underlying formations and by geologic erosion. Nearly level or very gently sloping soils on flood plains make up about 20 percent of the acreage in the county, and nearly level to very steep soils on uplands make up about 80 percent. Wister and Tuskahoma soils formed in similar shale material, but their development was controlled mainly by relief. The deep Wister soils generally are less sloping than the shallow Tuskahoma soils.

Time

Time, as a factor in soil formation, is difficult to measure strictly in years. The length of time needed for development of genetic horizons depends on the intensity and the interaction of the other soil-forming factors in promoting the losses, gains, transfers, or transformations of the constituents necessary in forming soil horizons. Soils that have no definite genetic horizons are young or immature. Older or mature soils have approached equilibrium with their environment and tend to have well-defined horizons.

The soils of LeFlore County range from young to old in formation. Stigler and Vian soils are examples of old soils; they are on uplands. Cowton soils are younger, but they also have well-expressed soil horizons. Oklared and

Ceda soils are young. They formed in recent alluvium on flood plains and show little horizon development.

Processes of soil formation

Processes involved in the formation of the soils in LeFlore County include the accumulation of organic matter, the leaching of calcium carbonates and bases, the reduction and transfer of iron, and the formation and translocation of silicate clay minerals. The results of these processes are not evident to the same degree in all the soils of the county.

Most of the older soils in the county have three major horizons, A, B, and C. Some of the properties in which the major horizons differ are color, texture, structure, consistence, reaction, organic matter content, and thickness. Subdivisions of the major horizons are based on minor differences.

The A horizon is the surface layer. The A1 horizon is a division of the surface layer in which there is an accumulation of organic matter. Cowton soils, which formed in parent material under a cover of predominantly native grasses, are higher in organic matter than Clebit soils, which formed in parent material under a cover of pine and hardwood trees. The A2 horizon is a division of the A horizon that is lighter colored and strongly leached of bases. Some soils in the county, Stigler soils for example, have both A1 and A2 horizons.

The B horizon is the mineral horizon below the A horizon, generally called the subsoil. In the older soils of the county, such as Wister soils, this is the horizon of maximum accumulation of silicate clay. The younger soils of the county, such as Oklared soils, do not have a B horizon.

The C horizon is a mineral horizon, excluding bedrock, that has been little affected by soil-forming processes but may have been modified by reduction of iron or accumulation of calcium carbonates. The R layer is consolidated bedrock.

Geology

LeFlore County is underlain by bedrock that consists mainly of interbedded sandstone and shale (*3, 5*). The ratio of sandstone to shale varies in the different geologic formations. Except for those soils that formed in terrace materials or recent alluvium, most of the soils in the county formed in material that weathered from sandstone and shale bedrock (fig. 15).

The more recent alluvium and older alluvium on terraces make up about one-fourth of the material in which the soils formed.

The youngest material in the county is the extensive recent alluvium on the flood plains of the Arkansas, Poteau, and Kiamichi Rivers and along local streams. This alluvium consists of unconsolidated sands, silts, and clays and ranges in thickness from a few feet to 30 feet or more. Some of the soils that formed on flood plains include the Moreland, Oklared, Coushatta, Neff, and Pocola soils along the rivers and the Ceda and Kenn soils along local streams.

The older alluvium is on broad terraces and mountain outwash plains. This alluvium commonly is associated with terraces along rivers and larger streams. The Kamie and McKamie soils are on Arkansas River terraces and Stigler soils along local streams. Sallisaw soils are on local stream terraces, and Sallisaw and Wetsaw soils are on mountain outwash plains in the southern half of the county.

Interbedded sandstones and shales make up about three-fourths of the county. They are older than the terrace material. The Boggy Formation is the youngest in the county. This formation makes up Cavanal and San Bois Mountains and caps Poteau, Sugarloaf, and Short Mountains. The fairly level beds consist of interbedded shale and hard sandstone. Bengal and Carnasaw soils formed in material that weathered from shale beds, and Clebit and Pirum soils formed in material that weathered from the sandstone members of the formation.

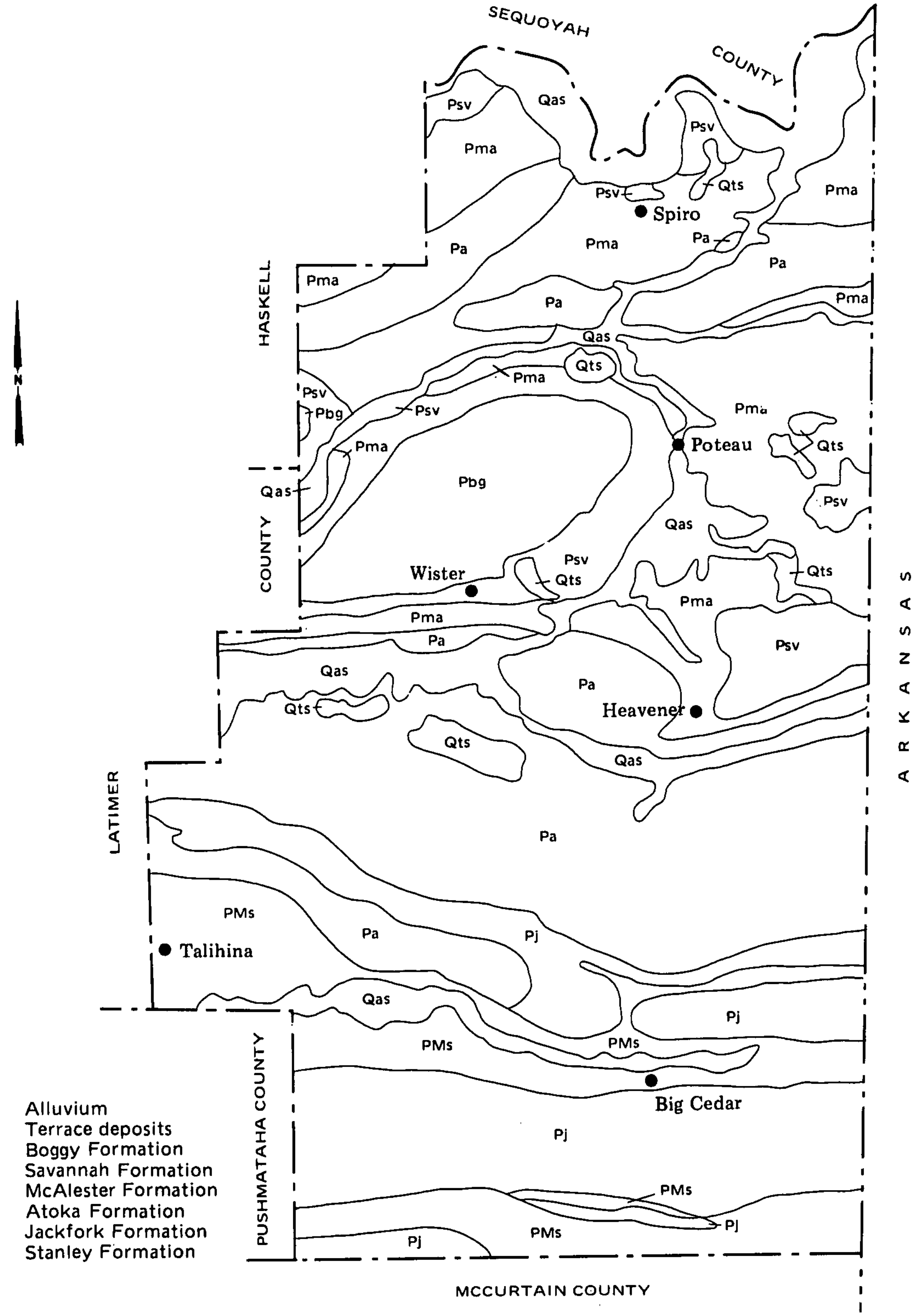
The Savannah and McAlester Formations are the next older formations. They underlie the valleys in the northern half of the county. These fairly level-bedded formations consist predominantly of shales but have several sandstone members. Some of the soils that formed in the weathered shales are the Stigler and Wister soils in valleys and the Cowton soils on low ridges, all of which support savannah vegetation.

The Atoka Formation is the formation next in age. It consists of gray shale interbedded with less than 25 percent sandstone. It forms many of the ridges and mountains in the northern two-thirds of the county. The Bengal and Carnasaw soils formed in material that weathered dominantly from shale. The Clebit and Pirum soils formed in material that weathered from sandstone.

The Jackfork Formation, oldest in the county, forms the Kiamichi, Winding Stair, and Rick Mountains in the southern part of the county. The formation is about 60 percent sandstone and 40 percent shale and forms the steep rocky slopes where the Pirum and Clebit soils formed in weathered sandstone and the Carnasaw soils formed in weathered shale. Colluvial soils such as Octavia soils are on the middle and lower slopes of the mountains.

The Stanley Shale Formation, called the Great Valley Maker because it is easily weathered, forms the Kiamichi River Valley and Octavia Valley. The formation consists of about 75 percent soft gray shale and about 25 percent soft graywacke sandstone. The Wister and Tuskahoma soils formed in the weathered shale, and the Sherless soils formed in material that weathered from sandstone.

Geologic deposits of economic importance are sand, rock, coal, and natural gas. Deep sand deposits are



Qas Alluvium
Qts Terrace deposits
Pbg Boggy Formation
Psv Savannah Formation
Pma McAlester Formation
Pa Atoka Formation
Pj Jackfork Formation
PMs Stanley Formation

Figure 15.—Geological units, LeFore County.

along the Arkansas River channel. Thick shale and sandstone strata are sources of material for road construction, and the sandstone slab rock is used as building facing. In the northern half of the county, coal beds are in some of the formations. Extensive natural gas exploration has yielded a number of producing wells.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Medium	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bottom land. The normal flood plain of a stream, subject to flooding.

Broad-base terrace. A ridge-type terrace built to control erosion by diverting runoff along the contour at a nonscouring velocity. The terrace is 10 to 20 inches high and 15 to 30 feet wide and has gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side. It may be nearly level or have a grade toward one or both ends.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazingland for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below

the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess alkali (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, and clay.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Gilgai. Commonly a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of Vertisols—clayey soils having a high coefficient of expansion and contraction with changes in moisture content.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Grazable woodland. AForest land that produces, at least periodically, sufficient understory vegetation suitable for forage that can be grazed without significantly impairing wood production and other forest values.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced

by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual.* The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an O or A horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Narrow-base terrace. A terrace no more than 4 to 8 feet wide at the base. A narrow-base terrace is similar to a broad-base terrace, except for the width of the ridge and channel.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Open space. A relatively undeveloped green or wooded area provided mainly within an urban area to minimize feelings of congested living.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range condition. The present composition of the plant community on a range site in relation to the

potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor, on the basis of how much the present plant community has departed from the potential.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 or E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-74 at Poteau, Oklahoma]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	52.4	29.3	40.9	76	1	36	1.81	.92	2.72	4	1.9
February---	57.0	33.3	45.2	79	7	56	2.70	1.15	3.89	5	1.2
March-------	64.5	40.5	52.5	87	15	175	3.96	1.91	5.63	6	.3
April-------	74.6	50.8	62.8	89	26	402	5.00	2.55	7.66	7	.0
May---------	81.8	58.3	70.1	92	36	630	5.81	2.74	7.52	7	.0
June--------	89.5	66.1	77.8	100	46	828	3.41	1.23	5.65	6	.0
July--------	94.8	70.5	82.7	107	54	1,002	3.91	1.48	6.83	5	.0
August------	94.1	68.7	81.4	107	51	956	3.27	1.63	4.83	5	.0
September--	87.1	61.8	74.5	101	40	726	4.24	2.00	7.36	6	.0
October-----	77.2	50.8	64.0	94	27	433	3.25	1.08	6.22	4	.0
November---	63.7	39.8	51.8	83	13	152	4.21	1.67	5.39	5	.1
December---	54.8	32.5	43.7	75	5	46	3.10	1.32	4.36	5	.7
Yearly											
Average:	74.3	50.2	62.3	---	---	---	---	---	---	---	---
Extreme:	---	---	---	110	-2	---	---	---	---	---	---
Total:	---	---	---	---	---	5,442	44.67	35.65	56.42	65	4.2

[1] A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-74 at Poteau, Oklahoma]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 25	April 8	April 18
2 years in 10 later than--	March 19	April 2	April 13
5 years in 10 later than--	March 8	March 21	March 3
First freezing temperature in fall:			
1 year in 10 earlier than--	November 2	October 25	October 18
2 years in 10 earlier than--	November 9	October 30	October 22
5 years in 10 earlier than--	November 22	November 9	October 30

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-74 at Poteau, Oklahoma]

Probability	Length of growing season if daily minimum temperature is--		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	231	205	190
8 years in 10	240	214	196
5 years in 10	259	232	209
2 years in 10	277	250	222
1 year in 10	287	259	229

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Bengal stony fine sandy loam, 15 to 35 percent slopes	16,297	1.6
2	Bengal-Clebit association, strongly sloping	59,113	5.8
3	Bengal-Octavia complex, 15 to 40 percent slopes	11,931	1.2
4	Bengal-Octavia-Tuskahoma complex, 4 to 20 percent slopes	33,145	3.3
5	Bengal-Pirum-Clebit complex, 5 to 15 percent slopes	34,291	3.4
6	Carnasaw stony loam, 4 to 15 percent slopes	65,486	6.5
7	Carnasaw stony loam, 15 to 35 percent slopes	65,314	6.5
8	Carnasaw-Clebit complex, 4 to 15 percent slopes	21,603	2.1
9	Carnasaw-Octavia complex, 15 to 35 percent slopes	28,373	2.8
10	Carnasaw-Octavia complex, 35 to 50 percent slopes	23,096	2.3
11	Carnasaw-Pirum complex, 4 to 15 percent slopes	8,830	0.9
12	Carnasaw-Pirum complex, 15 to 35 percent slopes	59,342	5.9
13	Ceda-Rubble land complex, frequently flooded	13,629	1.3
14	Clebit stony fine sandy loam, 10 to 30 percent slopes	4,324	0.4
15	Clebit stony fine sandy loam, 30 to 60 percent slopes	2,516	0.2
16	Clebit-Carnasaw-Pirum complex, cool, 4 to 35 percent slopes	8,894	0.9
17	Coushatta silt loam, rarely flooded, 0 to 1 percent slopes	1,554	0.2
18	Coushatta silt loam, rarely flooded, undulating	702	0.1
19	Coushatta silty clay loam, rarely flooded, undulating	2,140	0.2
20	Coushatta loamy fine sand, overwash, rarely flooded	238	*
21	Cowton loam, 2 to 5 percent slopes	7,648	0.8
22	Cowton loam, 5 to 15 percent slopes	2,348	0.2
23	Crevasse loamy fine sand, rarely flooded, undulating	986	0.1
24	Cupco silt loam, occasionally flooded	10,607	1.0
25	Garton silty clay loam, rarely flooded	1,842	0.2
26	Kamie loamy fine sand, 3 to 8 percent slopes	1,473	0.1
27	Kamie loamy fine sand, 3 to 8 percent slopes, eroded	2,625	0.3
28	Kanima shaly silty clay loam, 10 to 50 percent slopes	3,239	0.3
29	Kenn-Ceda complex, occasionally flooded	33,288	3.3
30	Kiomatia fine sandy loam, rarely flooded	1,101	0.1
31	Kiomatia silty clay loam, rarely flooded	328	*
32	Latanier silty clay, rarely flooded	1,728	0.2
33	Lela very fine sandy loam, overwash, rarely flooded	258	*
34	Lela silty clay, rarely flooded, 0 to 1 percent slopes	2,612	0.3
35	Lela silty clay, rarely flooded, 1 to 3 percent slopes	585	0.1
36	Lynnville Variant silty clay, occasionally flooded	1,019	0.1
37	McKamie loam, 3 to 5 percent slopes	831	0.1
38	McKamie loam, 5 to 12 percent slopes, eroded	296	*
39	Moreland silty clay, rarely flooded	2,540	0.3
40	Moreland silty clay loam, rarely flooded	2,454	0.2
41	Moreland silty clay loam, frequently flooded	1,028	0.1
42	Neff silt loam, occasionally flooded	54,566	5.4
43	Neff and Rexor silt loams, frequently flooded	29,779	2.9
44	Norwood silty clay loam, rarely flooded, 0 to 1 percent slopes	1,135	0.1
45	Norwood silty clay loam, rarely flooded, undulating	133	*
46	Norwood loam, rarely flooded	1,845	0.2
47	Octavia stony loam, 10 to 25 percent slopes	4,839	0.5
48	Octavia-Carnasaw complex, cool, 15 to 35 percent slopes	19,061	1.9
49	Oklared fine sandy loam, rarely flooded	3,993	0.4
50	Pirum-Carnasaw-Caston complex, cool, 35 to 60 percent slopes	19,918	2.0
51	Pirum-Clebit complex, 2 to 5 percent slopes	21,045	2.1
52	Pirum-Clebit complex, 2 to 5 percent slopes, eroded	4,862	0.5
53	Pirum-Octavia-Panama association, steep	37,031	3.7
54	Pocola silt loam, occasionally flooded	2,600	0.3
55	Psamments, rarely flooded, undulating	1,306	0.1
56	Redport silty clay loam, rarely flooded	1,276	0.1
57	Rexor silt loam, occasionally flooded	3,350	0.3
58	Roxana very fine sandy loam, rarely flooded	1,275	0.1
59	Sallisaw loam, 1 to 3 percent slopes	17,467	1.7
60	Sallisaw loam, 3 to 5 percent slopes	7,852	0.8
61	Sallisaw loam, 2 to 5 percent slopes, eroded	4,053	0.4
62	Sallisaw stony loam, 3 to 15 percent slopes	4,225	0.4
63	Severn very fine sandy loam, rarely flooded	748	0.1
64	Sherless-Bengal complex, 3 to 15 percent slopes	23,641	2.3
65	Shermore fine sandy loam, 1 to 3 percent slopes	4,504	0.4
66	Shermore fine sandy loam, 3 to 5 percent slopes	9,266	0.9
67	Shermore fine sandy loam, 2 to 5 percent slopes, eroded	19,795	2.0
68	Shermore fine sandy loam, 2 to 8 percent slopes, gullied	6,405	0.6
69	Speer fine sandy loam, occasionally flooded	6,102	0.6
70	Speer-Neff association, occasionally flooded, undulating	10,990	1.1

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
71	Stigler silt loam, 0 to 1 percent slopes	7,547	0.7
72	Stigler silt loam, 1 to 3 percent slopes	50,540	5.0
73	Stigler silt loam, terrace, 0 to 1 percent slopes	2,423	0.2
74	Stigler silt loam, terrace, 1 to 3 percent slopes	10,294	1.0
75	Tuskahoma loam, 3 to 10 percent slopes	4,749	0.5
76	Tuskahoma stony loam, 2 to 15 percent slopes	8,391	0.8
77	Vian silt loam, 1 to 3 percent slopes	7,118	0.7
78	Vian silt loam, 3 to 5 percent slopes	1,401	0.1
79	Wabbaseka silty clay, rarely flooded	470	*
80	Wetsaw fine sandy loam, 1 to 3 percent slopes	10,929	1.1
81	Wetsaw fine sandy loam, 3 to 5 percent slopes	1,635	0.2
82	Wing silt loam, 0 to 2 percent slopes	8,559	0.9
83	Wister silt loam, 0 to 1 percent slopes	1,172	0.1
84	Wister silt loam, 1 to 3 percent slopes	23,362	2.3
85	Wister silt loam, 3 to 5 percent slopes	1,974	0.2
	Large water areas	9,200	0.9
	Total	1,012,480	100.0

* Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Wheat	Grain sorghum	Soybeans	Improved bermuda-grass	Tall fescue	Alfalfa hay	Bahiagrass
	Bu	Bu	Bu	AUM*	AUM*	Ton	AUM*
1 Bengal	---	---	---	---	---	---	---
2:**							
Bengal	---	---	---	---	---	---	---
Clebit	---	---	---	---	---	---	---
3 Bengal-Octavia	---	---	---	---	---	---	---
4 Bengal-Octavia-Tuskahoma	---	---	---	---	---	---	---
5 Bengal-Pirum-Clebit	---	---	---	4.0	3.0	---	3.5
6, 7 Carnasaw	---	---	---	---	---	---	---
8 Carnasaw-Clebit	---	---	---	---	---	---	---
9, 10 Carnasaw-Octavia	---	---	---	---	---	---	---
11 Carnasaw-Pirum	---	---	---	---	---	---	---
12 Carnasaw-Pirum	---	---	---	---	---	---	---
13 Ceda-Rubble land	---	---	---	---	---	---	---
14, 15 Clebit	---	---	---	---	---	---	---
16 Clebit-Carnasaw-Pirum	---	---	---	---	---	---	---
17, 18, 19 Coushatta	35	60	34	11.5	9.0	4.5	8.5
20 Coushatta	30	45	29	8.0	6.0	4.0	5.5
21 Cowton	17	22	15	4.5	4.5	---	4.0
22 Cowton	---	---	---	4.0	4.0	---	3.5
23 Crevasse	10	15	8	3.0	---	---	2.5
24 Cupco	26	43	23	7.5	6.0	---	2.5
25 Garton	36	68	35	9.0	7.5	4.5	4.0
26 Kamie	20	35	20	6.5	5.5	---	5.5

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Wheat	Grain sorghum	Soybeans	Improved bermuda-grass	Tall fescue	Alfalfa hay	Bahiagrass
	Bu	Bu	Bu	AUM*	AUM*	Ton	AUM*
27. Kamie	18	30	18	5.5	4.5	---	4.5
28. Kanima	---	---	---	---	---	---	---
29. Kenn-Ceda	18	34	18	7.0	5.5	---	5.0
30, 31. Kiomatia	25	35	20	6.5	5.0	3.5	6.0
32. Latanier	35	55	33	10.0	7.5	3.5	2.5
33. Lela	35	50	35	8.5	7.5	4.0	4.0
34, 35. Lela	30	45	30	7.5	7.0	3.5	2.5
36. Lynnville Variant	20	30	20	9.0	7.5	---	2.5
37. McKamie	18	25	17	4.5	4.0	---	4.5
38. McKamie	---	---	---	4.0	3.0	---	4.0
39, 40. Moreland	36	55	35	9.5	7.5	3.5	2.5
41. Moreland	---	---	---	9.0	7.5	---	3.0
42. Neff	27	51	26	8.0	6.5	---	3.0
43. Neff and Rexor	---	---	---	8.0	6.5	---	4.0
44. Norwood	36	68	35	12.0	9.5	4.5	8.0
45. Norwood	35	68	34	11.5	9.0	4.5	8.0
46. Norwood	37	70	36	12.0	9.5	4.5	8.0
47. Octavia	---	---	---	---	---	---	---
48. Octavia-Carnasaw	---	---	---	---	---	---	---
49. Oklared	36	60	31	11.0	7.0	4.2	7.0
50. Pirum-Carnasaw-Caston	---	---	---	---	---	---	---
51. Pirum-Clebit	21	30	20	6.0	5.5	---	5.0
52	18	25	17	5.5	5.0	---	4.5
53:**							
Pirum	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Wheat	Grain sorghum	Soybeans	Improved bermuda-grass	Tall fescue	Alfalfa hay	Bahiagrass
	Bu	Bu	Bu	AUM*	AUM*	Ton	AUM*
53:**							
Octavia	---	---	---	---	---	---	---
Panama	---	---	---	---	---	---	---
54 Pocola	24	35	22	7.0	5.5	3.0	2.5
55 Psamments	---	---	---	---	---	---	---
56 Redport	38	70	37	12.0	9.5	5.0	8.0
57 Rexor	30	59	30	8.0	6.5	---	7.0
58 Roxana	36	65	35	11.5	9.0	4.3	8.0
59 Sallisaw	28	42	25	7.0	5.0	---	6.5
60 Sallisaw	25	36	20	6.0	4.5	---	5.5
61 Sallisaw	21	30	15	5.5	4.0	---	4.5
62 Sallisaw	---	---	---	---	---	---	---
63 Severn	36	65	35	11.5	9.0	4.3	8.0
64 Sherless-Bengal	---	---	---	4.5	3.5	---	4.0
65 Shermore	26	43	25	6.5	5.0	---	5.5
66 Shermore	23	40	20	6.0	4.5	---	5.0
67 Shermore	20	34	15	5.5	4.0	---	4.5
68 Shermore	---	---	---	4.0	3.5	---	3.5
69 Speer	27	59	25	8.0	6.0	---	6.5
70:**							
Speer	27	59	28	8.0	6.0	---	6.5
Neff	27	51	26	8.0	6.5	---	3.0
71 Stigler	32	43	27	8.0	6.5	---	3.0
72 Stigler	31	42	26	8.0	6.5	---	4.0
73 Stigler	32	43	27	8.0	6.5	---	3.0

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Wheat	Grain sorghum	Soybeans	Improved bermuda-grass	Tall fescue	Alfalfa hay	Bahiagrass
	Bu	Bu	Bu	AUM*	AUM*	Ton	AUM*
74------------------------- Stigler	31	42	26	8.0	6.5	---	4.0
75------------------------- Tuskahoma	---	---	---	4.0	2.5	---	3.0
76------------------------- Tuskahoma	---	---	---	---	---	---	---
77------------------------- Vian	31	55	26	7.0	6.0	---	4.0
78------------------------- Vian	28	50	23	6.5	4.5	---	4.0
79------------------------- Wabbaseka	33	50	31	9.0	7.5	3.3	3.0
80------------------------- Wetsaw	25	36	23	6.0	5.5	---	4.0
81------------------------- Wetsaw	22	32	21	5.5	5.0	---	4.5
82------------------------- Wing	---	---	---	4.0	2.5	---	3.0
83------------------------- Wister	30	42	25	7.0	5.5	---	3.0
84------------------------- Wister	30	40	25	7.0	5.5	---	4.0
85------------------------- Wister	25	35	20	6.5	5.0	---	4.0

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

[Only the soils that support rangeland vegetation suitable for grazing are listed]

Map symbol and soil name	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1 Bengal	Sandy Savannah	Favorable	4,000	Little bluestem	25
		Normal	2,800	Big bluestem	10
		Unfavorable	2,000	Indiangrass	10
				Switchgrass	5
2:*					
Bengal	Sandy Savannah	Favorable	4,000	Little bluestem	25
		Normal	2,800	Big bluestem	10
		Unfavorable	2,000	Indiangrass	10
				Switchgrass	5
Clebit	Shallow Savannah	Favorable	2,200	Little bluestem	35
		Normal	1,600	Big bluestem	10
		Unfavorable	1,200	Indiangrass	5
				Switchgrass	5
4:*					
Bengal	Sandy Savannah	Favorable	4,000	Little bluestem	25
		Normal	2,800	Big bluestem	10
		Unfavorable	2,000	Indiangrass	10
				Switchgrass	5
Octavia	Sandy Savannah	Favorable	4,700	Little bluestem	20
		Normal	3,400	Big bluestem	10
		Unfavorable	2,700	Indiangrass	10
				Switchgrass	5
Tuskahoma	Shallow Savannah	Favorable	3,200	Little bluestem	30
		Normal	2,400	Big bluestem	20
		Unfavorable	1,800	Indiangrass	5
				Switchgrass	5
5:*					
Bengal	Sandy Savannah	Favorable	4,000	Little bluestem	25
		Normal	2,800	Big bluestem	10
		Unfavorable	2,000	Indiangrass	10
				Switchgrass	5
Pirum	Sandy Savannah	Favorable	4,500	Little bluestem	25
		Normal	3,200	Big bluestem	15
		Unfavorable	2,500	Indiangrass	10
				Panicum	5
Clebit	Shallow Savannah	Favorable	3,500	Little bluestem	35
		Normal	2,200	Big bluestem	10
		Unfavorable	1,900	Indiangrass	5
				Switchgrass	5
8:*					
Carnasaw	Sandy Savannah	Favorable	4,500	Little bluestem	25
		Normal	3,200	Big bluestem	15
		Unfavorable	2,500	Indiangrass	10
				Switchgrass	5
Clebit	Shallow Savannah	Favorable	3,500	Little bluestem	35
		Normal	2,200	Big bluestem	10
		Unfavorable	1,900	Indiangrass	5
				Switchgrass	5
9:*					
Carnasaw	Sandy Savannah	Favorable	4,500	Little bluestem	25
		Normal	3,200	Big bluestem	15
		Unfavorable	2,500	Indiangrass	10
				Switchgrass	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Map symbol and soil name	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
9:*					
Octavia	Sandy Savannah	Favorable	4,500	Little bluestem	40
		Normal	3,200	Big bluestem	5
		Unfavorable	2,500	Switchgrass	5
				Indiangrass	5
14 Clebit	Shallow Savannah	Favorable	3,200	Little bluestem	35
		Normal	2,400	Big bluestem	10
		Unfavorable	1,800	Indiangrass	5
				Switchgrass	5
15 Clebit	Savannah Breaks	Favorable	2,800	Little bluestem	40
		Normal	2,000	Big bluestem	5
		Unfavorable	1,400		
16:*					
Clebit	Shallow Savannah	Favorable	2,800	Little bluestem	40
		Normal	2,000	Big bluestem	5
		Unfavorable	1,400		
Carnasaw	Sandy Savannah	Favorable	4,500	Little bluestem	25
		Normal	3,200	Big bluestem	15
		Unfavorable	2,500	Indiangrass	10
				Switchgrass	5
Pirum	Sandy Savannah	Favorable	3,500	Little bluestem	40
		Normal	2,400	Big bluestem	5
		Unfavorable	1,700		
21, 22 Cowton	Loamy Savannah	Favorable	4,000	Big bluestem	20
		Normal	2,800	Little bluestem	15
		Unfavorable	2,000	Eastern gamagrass	10
				Indiangrass	5
				Switchgrass	5
				Panicum	5
				Compassplant	5
				Virginia tephrosia	5
51,* 52:*					
Pirum	Sandy Savannah	Favorable	4,500	Little bluestem	25
		Normal	3,200	Big bluestem	15
		Unfavorable	2,500	Indiangrass	10
				Panicum	5
Clebit	Shallow Savannah	Favorable	3,500	Little bluestem	35
		Normal	2,200	Big bluestem	10
		Unfavorable	1,900	Switchgrass	5
				Indiangrass	5
71, 72 Stigler	Loamy Savannah	Favorable	6,500	Big bluestem	25
		Normal	4,500	Indiangrass	15
		Unfavorable	3,000	Little bluestem	10
75, 76 Tuskahoma	Shallow Savannah	Favorable	3,200	Little bluestem	30
		Normal	2,400	Big bluestem	20
		Unfavorable	1,800	Indiangrass	5
				Switchgrass	5
77, 78 Vian	Loamy Savannah	Favorable	5,500	Big bluestem	20
		Normal	4,000	Little bluestem	15
		Unfavorable	3,000	Indiangrass	5
				Switchgrass	5
				Longspike tridens	5
				Panicum	5
				Tickclover	5
				Compassplant	5
				Hickory	5
				Sedge	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Map symbol and soil name	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
82 Wing	Slickspot	Favorable	2,000	Switchgrass	15
		Normal	1,300	Little bluestem	15
		Unfavorable	800	Indiangrass	10
				Threeawn	10
				Paspalum	5
				Dropseed	5
				Sedge	5
83, 84, 85 Wister	Loamy Savannah	Favorable	5,000	Big bluestem	25
		Normal	3,500	Indiangrass	15
		Unfavorable	2,500	Little bluestem	10

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
1 Bengal	5x3	Severe	Moderate	Slight	Shortleaf pine	50	Loblolly pine, shortleaf pine.
					Blackjack oak	---	
					Post oak	---	
2:*							
Bengal	5x2	Slight	Moderate	Slight	Shortleaf pine	50	Loblolly pine, shortleaf pine.
					Blackjack oak	---	
					Post oak	---	
Clebit	5x2	Slight	Moderate	Moderate	Shortleaf pine	40	Planting not recommended.
					Eastern redcedar	30	
					Post oak	---	
					Blackjack oak	---	
					Winged elm	---	
3:*							
Bengal	5x2	Moderate	Moderate	Slight	Shortleaf pine	50	Loblolly pine, shortleaf pine.
					Blackjack oak	---	
					Post oak	---	
Octavia	4x8	Moderate	Moderate	Slight	Shortleaf pine	60	Loblolly pine, shortleaf pine, northern red oak, black walnut.
					Northern red oak	60	
					Hickory	---	
					White oak	---	
4:*							
Bengal	5x2	Slight	Moderate	Slight	Shortleaf pine	50	Loblolly pine, shortleaf pine.
					Blackjack oak	---	
					Post oak	---	
Octavia	4x8	Slight	Moderate	Slight	Shortleaf pine	60	Loblolly pine, shortleaf pine.
					Northern red oak	60	
					Hickory	---	
					White oak	---	
Tuskahoma	5x0	Severe	Moderate	Moderate	Eastern redcedar	30	Planting not recommended.
					Winged elm	---	
					Blackjack oak	---	
					Post oak	---	
5:*							
Bengal	5o1	Slight	Slight	Slight	Shortleaf pine	50	Loblolly pine, shortleaf pine.
					Blackjack oak	---	
					Post oak	---	
Pirum	4o1	Slight	Slight	Slight	Shortleaf pine	60	Loblolly pine.
Clebit	5d2	Slight	Slight	Moderate	Shortleaf pine	40	Planting not recommended.
					Eastern redcedar	30	
					Post oak	---	
					Blackjack oak	---	
					Winged elm	---	
6 Carnasaw	4x2	Slight	Moderate	Slight	Shortleaf pine	60	Loblolly pine, shortleaf pine.
					Northern red oak	---	
7 Carnasaw	4x2	Moderate	Moderate	Slight	Shortleaf pine	60	Loblolly pine, shortleaf pine.
					Northern red oak	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
8:*							
Carnasaw	5x2	Slight	Moderate	Slight	Shortleaf pine	50	Loblolly pine, shortleaf pine.
Clebit	5x2	Slight	Moderate	Moderate	Shortleaf pine Eastern redcedar Post oak Blackjack oak Winged elm	40 30 --- --- ---	Planting not recommended.
9:*							
Carnasaw	5x3	Severe	Moderate	Severe	Shortleaf pine Hickory	50 ---	Loblolly pine, shortleaf pine.
Octavia	5x3	Severe	Moderate	Severe	Shortleaf pine Hickory	50 ---	Loblolly pine, shortleaf pine.
10:*							
Carnasaw	4r9	Severe	Severe	Slight	Shortleaf pine Hickory White oak	60 --- ---	Loblolly pine, shortleaf pine.
Octavia	4r9	Severe	Severe	Slight	Shortleaf pine Northern red oak Hickory White oak	60 60 --- ---	Loblolly pine, shortleaf pine.
11:*							
Carnasaw	4x2	Slight	Moderate	Slight	Shortleaf pine Northern red oak White oak	60 --- ---	Loblolly pine, shortleaf pine.
Pirum	4x2	Slight	Moderate	Slight	Shortleaf pine Southern red oak White oak	60 60 60	Loblolly pine, shortleaf pine.
12:*							
Carnasaw	4x3	Severe	Moderate	Slight	Shortleaf pine Northern red oak White oak	60 --- ---	Loblolly pine, shortleaf pine.
Pirum	4x3	Severe	Moderate	Slight	Shortleaf pine Northern red oak White oak	60 60 60	Loblolly pine, shortleaf pine.
13:*							
Ceda	3x9	Slight	Severe	Moderate	Shortleaf pine Southern red oak White oak Sweetgum	70 --- --- 80	Loblolly pine, shortleaf pine, American sycamore, sweetgum.
Rubble land.	---	---	---	---	---	---	
14 Clebit	5x0	Severe	Severe	Severe	Shortleaf pine Eastern redcedar Post oak Blackjack oak Winged elm	40 30 --- --- ---	Planting not recommended.
15 Clebit	5r0	Severe	Severe	Severe	Shortleaf pine Eastern redcedar Post oak Blackjack oak Winged elm	40 30 30 --- ---	Planting not recommended.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
16:*							
Clebit	5x0	Severe	Severe	Severe	Northern red oak	20	Planting not recommended.
Carnasaw	5x0	Moderate	Moderate	Severe	Shortleaf pine Northern red oak	25 20	Planting not recommended.
Pirum	5x0	Moderate	Severe	Severe	Shortleaf pine Northern red oak White oak	25 25 ---	Planting not recommended.
17, 18, 19 Coushatta	2o4	Slight	Slight	Slight	Eastern cottonwood Pecan American sycamore	100 --- ---	Eastern cottonwood, American sycamore, black walnut, pecan.
20 Coushatta	2s5	Slight	Moderate	Moderate	Eastern cottonwood Pecan American sycamore	100 --- ---	Eastern cottonwood, black walnut, pecan, American sycamore.
23 Crevasse	3s6	Slight	Moderate	Severe	Eastern cottonwood American sycamore	90 ---	Eastern cottonwood, American sycamore.
24 Cupco	3w5	Slight	Moderate	Moderate	Green ash Water oak Willow oak	--- 80 ---	Green ash, water oak, bur oak.
25 Garton	2o4	Slight	Slight	Slight	Eastern cottonwood American sycamore Black walnut Hackberry Pecan	100 --- --- --- ---	Eastern cottonwood, American sycamore, black walnut, green ash, pecan.
26, 27 Kamie	3o7	Slight	Slight	Slight	Southern red oak Post oak	70 ---	Shortleaf pine, loblolly pine, black walnut.
29:*							
Kenn	3o7	Slight	Slight	Slight	Shortleaf pine Southern red oak Sweetgum Post oak	70 70 80 ---	Shortleaf pine, loblolly pine, black walnut.
Ceda	3f9	Slight	Slight	Severe	Shortleaf pine Southern red oak White oak Sweetgum American sycamore	70 --- --- 80 80	Loblolly pine, shortleaf pine, American sycamore, sweetgum.
30, 31 Kiomatia	2s5	Slight	Moderate	Moderate	Eastern cottonwood	100	Eastern cottonwood, black walnut, American sycamore.
32 Latanier	2w5	Slight	Moderate	Moderate	Green ash Pecan Eastern cottonwood American sycamore	80 --- 100 ---	Eastern cottonwood, American sycamore, pecan.
33 Lela	3w5	Slight	Slight	Moderate	Eastern cottonwood Pecan Green ash	90 --- ---	Eastern cottonwood, green ash, bur oak, pecan.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
34, 35 Lela	3w5	Slight	Moderate	Moderate	Eastern cottonwood Pecan Green ash	90 --- ---	Eastern cottonwood, green ash, bur oak, pecan.
36 Lynnville Variant	2w5	Slight	Moderate	Moderate	Eastern cottonwood Pecan Black willow	100 --- ---	Eastern cottonwood, pecan, American sycamore.
37, 38 McKamie	4c8	Slight	Moderate	Slight	Post oak Southern red oak	--- 50	Loblolly pine, shortleaf pine.
39, 40 Moreland	3w5	Slight	Moderate	Moderate	Green ash Eastern cottonwood Sweetgum Water oak Pecan	75 100 90 90 ---	Eastern cottonwood, American sycamore, green ash, bur oak, pecan.
41 Moreland	3w5	Slight	Moderate	Moderate	Green ash Eastern cottonwood Pecan	70 90 80	Eastern cottonwood, American sycamore, green ash, bur oak, pecan.
42 Neff	3w8	Slight	Moderate	Moderate	Sweetgum Water oak Willow oak Green ash	80 80 80 ---	Eastern cottonwood, loblolly pine, sweetgum, green ash, shortleaf pine.
43*:							
Neff	3w8	Slight	Moderate	Moderate	Sweetgum Water oak Willow oak Green ash	80 80 80 ---	Eastern cottonwood, loblolly pine, sweetgum, green ash, shortleaf pine.
Rexor	2w8	Slight	Slight	Moderate	Shortleaf pine Sweetgum Black walnut	80 --- ---	Loblolly pine, Eastern cottonwood, green ash, black walnut, pecan, American sycamore.
44, 45, 46 Norwood	2o4	Slight	Slight	Slight	Eastern cottonwood Pecan American sycamore	100 --- ---	Eastern cottonwood, American sycamore, black walnut, pecan.
47 Octavia	4x8	Moderate	Moderate	Slight	Shortleaf pine Northern red oak Hickory White oak	60 60 --- ---	Loblolly pine, shortleaf pine, black walnut.
48:*							
Octavia	4x9	Severe	Moderate	Slight	Shortleaf pine Northern red oak Hickory White oak	60 60 --- ---	Loblolly pine, shortleaf pine, northern red oak, white oak, black walnut.
Carnasaw	4x9	Severe	Moderate	Slight	Shortleaf pine Northern red oak Hickory White oak	60 --- --- ---	Loblolly pine, shortleaf pine.
49 Oklared	2o4	Slight	Slight	Slight	Eastern cottonwood Pecan Black walnut	100 75 ---	Eastern cottonwood, American sycamore, pecan, black walnut.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
50:*							
Pirum	4r6	Severe	Severe	Slight	White oak	60	Northern red oak, white oak, black walnut, black cherry.
					Black gum	---	
					Red maple	---	
					Hickory	---	
Carnasaw	4r6	Severe	Severe	Slight	Red maple	---	Northern red oak, white oak, black walnut, black cherry.
					Hickory	---	
					White oak	---	
					Northern red oak	60	
					Black gum	---	
Caston	4r6	Severe	Severe	Slight	Red maple	---	Northern red oak, white oak, black walnut, black cherry.
					Northern red oak	60	
					White oak	---	
					Hickory	---	
51,* 52:*							
Pirum	4o1	Slight	Slight	Slight	Shortleaf pine	60	Loblolly pine, shortleaf pine.
					Southern red oak	60	
Clebit	5d2	Slight	Slight	Moderate	Shortleaf pine	40	Planting not recommended.
					Eastern redcedar	30	
					Post oak	---	
					Blackjack oak	---	
					Winged elm	---	
53:*							
Pirum	5r3	Severe	Severe	Moderate	Shortleaf pine	50	Loblolly pine, shortleaf pine.
					Northern red oak	---	
					White oak	---	
Octavia	4r3	Severe	Severe	Slight	Northern red oak	60	Loblolly pine, shortleaf pine.
					White oak	---	
					Hickory	---	
					Shortleaf pine	60	
Panama	4r3	Severe	Severe	Slight	Shortleaf pine	60	Loblolly pine, shortleaf pine.
					White oak	---	
					Northern red oak	60	
54 Pocola	4w6	Slight	Severe	Severe	Green ash	70	Eastern cottonwood, green ash, pecan, bur oak.
					Pecan	---	
					Willow oak	---	
					Bur oak	---	
					Post oak	---	
					Hackberry	---	
					Cedar elm	---	
56 Redport	2o4	Slight	Slight	Slight	Eastern cottonwood	96	Eastern cottonwood, black walnut, bur oak, pecan, green ash.
					Pecan	---	
					Green ash	---	
					Black walnut	---	
57 Rexor	2o7	Slight	Slight	Slight	Shortleaf pine	80	Loblolly pine, black walnut, eastern cottonwood, pecan, American sycamore.
					Sweetgum	---	
					Black walnut	---	
58 Roxana	2o4	Slight	Slight	Slight	Eastern cottonwood	100	Eastern cottonwood, American sycamore, black walnut, pecan.
					Pecan	100	
					American sycamore	---	
					Black walnut	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
59, 60, 61 Sallisaw	3o7	Slight	Slight	Slight	Shortleaf pine	70	Shortleaf pine, loblolly pine, black walnut.
					Southern red oak	---	
					Hackberry	---	
					American elm	---	
					Green ash	---	
62 Sallisaw	3x8	Slight	Moderate	Slight	Shortleaf pine	70	Shortleaf pine, loblolly pine, black walnut.
					Southern red oak	---	
					Hackberry	---	
					American elm	---	
					Green ash	---	
63 Severn	2o4	Slight	Slight	Slight	Eastern cottonwood	100	Eastern cottonwood, American sycamore, pecan, black walnut.
					Pecan	76	
					Hackberry	---	
					American sycamore	---	
					Black walnut	---	
64:*							
Sherless	3o1	Slight	Slight	Slight	Shortleaf pine	70	Loblolly pine, shortleaf pine.
					White oak	---	
					Southern red oak	---	
					Sweetgum	---	
					Blackgum	---	
					Hickory	---	
Bengal	3o1	Slight	Slight	Slight	Shortleaf pine	70	Loblolly pine, shortleaf pine.
					White oak	---	
					Post oak	---	
					Southern red oak	---	
					Sweetgum	---	
65, 66, 67 Shermore	3o1	Slight	Slight	Slight	Shortleaf pine	70	Loblolly pine, shortleaf pine.
					Southern red oak	70	
					Post oak	---	
					White oak	---	
					Hickory	---	
68 Shermore	4d3	Severe	Severe	Moderate	Southern red oak	60	Loblolly pine, shortleaf pine.
					Shortleaf pine	60	
					Post oak	---	
					White oak	---	
					Hickory	---	
69 Speer	2o7	Slight	Slight	Slight	Southern red oak	80	Loblolly pine, shortleaf pine, black walnut, southern red oak.
					Sweetgum	90	
					Shortleaf pine	80	
70:*							
Speer	2o7	Slight	Slight	Slight	Southern red oak	80	Loblolly pine, shortleaf pine, black walnut, southern red oak.
					Sweetgum	90	
					Shortleaf pine	80	
Neff	3w8	Slight	Moderate	Moderate	Sweetgum	80	Eastern cottonwood, loblolly pine, sweetgum, green ash, shortleaf pine.
					Water oak	80	
					Willow oak	80	
					Green ash	---	
71, 72 Stigler	5o0	Slight	Slight	Slight	Post oak	30	Planting not recommended.
					American elm	---	
73, 74 Stigler	3w5	Slight	Moderate	Slight	Green ash	---	Sweetgum.
					Water oak	---	
					Southern red oak	70	
					Sugarberry	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	
75 Tuskahoma	5d0	Slight	Slight	Severe	Winged elm Eastern redcedar Post oak Blackjack oak	--- 30 --- ---	Planting not recommended.
76 Tuskahoma	5x0	Moderate	Moderate	Severe	Eastern redcedar Post oak Blackjack oak Winged elm	30 --- --- ---	Planting not recommended.
77, 78 Vian	5o0	Slight	Slight	Slight	Post oak Elm Sassafras	30 --- ---	Planting not recommended.
79 Wabbaseka	2w5	Slight	Moderate	Moderate	Green ash Pecan Eastern cottonwood American sycamore	80 --- --- ---	Eastern cottonwood, American sycamore, pecan.
80, 81 Wetsaw	3o1	Slight	Slight	Slight	Shortleaf pine Southern red oak White oak Sweetgum Blackgum Hickory	70 --- --- --- --- ---	Shortleaf pine, loblolly pine.
83, 84, 85 Wister	5o0	Slight	Slight	Slight	Winged elm Eastern redcedar Post oak	30 30 30	Planting not recommended.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WOODLAND UNDERSTORY VEGETATION

[Only the soils suitable for production of commercial trees are listed]

Map symbol and soil name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
		Lb/acre		Pct
1 Bengal	Favorable	1,500	Little bluestem	15
	Normal	1,200	Big bluestem	10
	Unfavorable	1,000	Indiangrass	5
			Switchgrass	5
2:*				
Bengal	Favorable	1,500	Little bluestem	15
	Normal	1,200	Big bluestem	10
	Unfavorable	1,000	Indiangrass	5
			Switchgrass	5
Clebit	Favorable	1,600	Little bluestem	20
	Normal	1,100	Big bluestem	5
	Unfavorable	800		
3:*				
Bengal	Favorable	1,500	Little bluestem	15
	Normal	1,200	Big bluestem	10
	Unfavorable	1,000	Indiangrass	5
			Switchgrass	5
Octavia	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400	Switchgrass	5
			Indiangrass	5
4:*				
Bengal	Favorable	1,500	Little bluestem	15
	Normal	1,200	Big bluestem	10
	Unfavorable	1,000	Indiangrass	5
			Switchgrass	5
Octavia	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400	Indiangrass	5
			Switchgrass	5
Tuskahoma	Favorable	1,400	Little bluestem	20
	Normal	900	Big bluestem	10
	Unfavorable	600	Indiangrass	5
			Switchgrass	5
5:*				
Bengal	Favorable	1,500	Little bluestem	15
	Normal	1,200	Big bluestem	10
	Unfavorable	1,000	Indiangrass	5
			Switchgrass	5
Pirum	Favorable	4,500	Little bluestem	25
	Normal	3,200	Big bluestem	15
	Unfavorable	2,500	Indiangrass	10
			Panicum	5
Clebit	Favorable	1,600	Little bluestem	20
	Normal	1,100	Big bluestem	5
	Unfavorable	800		
6, 7 Carnasaw	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400	Switchgrass	5
			Indiangrass	5
8:*				
Carnasaw	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400	Switchgrass	5
			Indiangrass	5

See footnote at end of table.

TABLE 8.--WOODLAND UNDERSTORY VEGETATION--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
8:*				
Clebit	Favorable	1,600	Little bluestem	20
	Normal	1,100	Big bluestem	5
	Unfavorable	800		
9,* 10:*				
Carnasaw	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400	Switchgrass	5
			Indiangrass	5
Octavia	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400	Switchgrass	5
			Indiangrass	5
11:*				
Carnasaw	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400	Switchgrass	5
			Indiangrass	5
Pirum	Favorable	4,500	Little bluestem	25
	Normal	3,200	Big bluestem	15
	Unfavorable	2,500	Indiangrass	10
			Switchgrass	5
12:*				
Carnasaw	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400	Switchgrass	5
			Indiangrass	5
Pirum	Favorable	3,500	Little bluestem	40
	Normal	2,400	Big bluestem	5
	Unfavorable	1,700		
13:*				
Ceda	Favorable	1,600	Panicum	15
	Normal	1,100	Sedge	15
	Unfavorable	800	Beaked panicum	15
			Little bluestem	5
			Switchgrass	5
Rubble land.				
14, 15 Clebit	Favorable	1,600	Little bluestem	20
	Normal	1,100	Big bluestem	5
	Unfavorable	800		
16:*				
Clebit	Favorable	1,600	Little bluestem	20
	Normal	1,100	Big bluestem	5
	Unfavorable	800		
Carnasaw	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400	Switchgrass	5
			Indiangrass	5
Pirum	Favorable	3,500	Little bluestem	40
	Normal	2,400	Big bluestem	5
	Unfavorable	1,700		
17, 18, 19 Coushatta	Favorable	5,000	Giant cane	20
	Normal	4,000	Beaked panicum	15
	Unfavorable	2,500	Sedge	10
			Virginia wildrye	10
			Purpletop	10
			Little bluestem	5

See footnote at end of table.

TABLE 8.--WOODLAND UNDERSTORY VEGETATION--Continued

Map symbol and soil name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
		Lb/acre		Pct
20: Coushatta	Favorable	5,000	Giant cane	20
	Normal	4,000	Beaked panicum	15
	Unfavorable	2,500	Sedge	10
			Virginia wildrye	10
			Longleaf uniola	10
			Purpletop	10
			Little bluestem	5
23: Crevasse	Favorable	3,000	Little bluestem	50
	Normal	2,000	Indiangrass	10
	Unfavorable	1,200	Crinkleawn	7
			Brownseed paspalum	5
24: Cupco	Favorable	4,000	Panicum	15
	Normal	3,000	Little bluestem	10
	Unfavorable	2,100	Sedge	10
			Giant cane	10
			Big bluestem	5
			Indiangrass	5
			Switchgrass	5
25: Garton	Favorable	4,500	Canada wildrye	15
	Normal	3,000	Sedge	10
	Unfavorable	2,600	Beaked panicum	10
			Little bluestem	10
			Broadleaf uniola	10
			Big bluestem	5
			Switchgrass	5
26, 27: Kamie	Favorable	2,800	Little bluestem	15
	Normal	1,800	Big bluestem	15
	Unfavorable	1,200	Indiangrass	5
			Switchgrass	5
			Purple lovegrass	5
			Scribner panicum	5
			Purpletop	5
			Sunflower	5
			Arrowfeather threeawn	5
29:*				
Kenn	Favorable	3,800	Little bluestem	15
	Normal	2,700	Sedge	10
	Unfavorable	2,000	Panicum	10
			Big bluestem	5
			Indiangrass	5
			Switchgrass	5
			Uniola	5
Ceda	Favorable	1,600	Panicum	15
	Normal	1,100	Sedge	15
	Unfavorable	800	Beaked panicum	15
			Little bluestem	5
			Switchgrass	5
30, 31: Kiomatia	Favorable	5,000	Beaked panicum	20
	Normal	4,000	Giant cane	20
	Unfavorable	2,500	Sedge	10
			Virginia wildrye	10
			Purpletop	10
			Longleaf uniola	5
32: Latanier	Favorable	4,500	Big bluestem	10
	Normal	3,000	Switchgrass	15
	Unfavorable	3,000	Indiangrass	15
			Tall dropseed	5
			Sedge	10
			Canada wildrye	10

See footnote at end of table.

TABLE 8.--WOODLAND UNDERSTORY VEGETATION--Continued

Map symbol and soil name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
		Lb/acre		Pct
33, 34, 35	Favorable	4,600	Big bluestem	25
Lela	Normal	3,700	Switchgrass	15
	Unfavorable	3,000	Indiangrass	15
			Prairie cordgrass	10
			Tall dropseed	5
			Sunflower	5
			Goldenrod	5
			Sedge	5
			Beaked panicum	5
36	Favorable	4,500	Switchgrass	15
Lynnville Variant	Normal	3,600	Indiangrass	15
	Unfavorable	3,000	Big bluestem	10
			Sedge	10
			Canada wildrye	10
			Tall dropseed	5
37, 38	Favorable	2,000	Little bluestem	40
McKamie	Normal	1,500	Panicum	10
	Unfavorable	1,100	Longleaf uniola	10
			Threeawn	10
39, 40, 41	Favorable	4,600	Big bluestem	20
Moreland	Normal	3,200	Switchgrass	15
	Unfavorable	3,000	Indiangrass	15
			Tall dropseed	5
			Sedge	10
42	Favorable	4,600	Little bluestem	15
Neff	Normal	3,300	Panicum	10
	Unfavorable	2,500	Sedge	10
			Big bluestem	5
			Indiangrass	5
43:*				
Neff	Favorable	4,600	Little bluestem	15
	Normal	3,300	Panicum	10
	Unfavorable	2,500	Sedge	10
			Big bluestem	5
			Indiangrass	5
Rexor	Favorable	4,000	Little bluestem	15
	Normal	3,200	Panicum	10
	Unfavorable	2,500	Sedge	10
			Big bluestem	5
			Indiangrass	5
44, 45, 46	Favorable	5,000	Virginia wildrye	15
Norwood	Normal	4,000	Beaked panicum	10
	Unfavorable	2,500	Indiangrass	10
			Little bluestem	10
			Switchgrass	10
			Sedge	10
			Big bluestem	5
			Rustyseed paspalum	5
47	Favorable	2,400	Little bluestem	15
Octavia	Normal	1,800	Big bluestem	10
	Unfavorable	1,400	Switchgrass	5
			Indiangrass	5

See footnote at end of table.

TABLE 8.--WOODLAND UNDERSTORY VEGETATION--Continued

Map symbol and soil name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
		Lb/acre		Pct
48:*				
Octavia	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400	Switchgrass	5
			Indiangrass	5
Carnasaw	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400	Switchgrass	5
			Indiangrass	5
49 Oklared	Favorable	4,500	Little bluestem	15
	Normal	4,000	Canada wildrye	10
	Unfavorable	2,500	Broadleaf uniola	10
			Giant cane	10
			Switchgrass	5
			Big bluestem	5
			Beaked panicum	5
			Sedge	5
50:*				
Pirum	Favorable	2,400	Little bluestem	25
	Normal	1,800	Big bluestem	15
	Unfavorable	1,400	Indiangrass	10
			Panicum	5
Carnasaw	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400	Switchgrass	5
			Indiangrass	5
Caston	Favorable	2,200	Little bluestem	35
	Normal	1,600	Big bluestem	10
	Unfavorable	1,200	Beaked panicum	10
			Scribner panicum	10
51,* 52:*				
Pirum	Favorable	2,400	Little bluestem	25
	Normal	1,000	Big bluestem	15
	Unfavorable	1,400	Indiangrass	10
			Panicum	5
Clebit	Favorable	1,600	Little bluestem	20
	Normal	1,100	Big bluestem	5
	Unfavorable	800		
53:*				
Pirum	Favorable	2,400	Little bluestem	25
	Normal	1,800	Big bluestem	15
	Unfavorable	1,400	Indiangrass	10
			Panicum	5
Octavia	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400	Switchgrass	5
			Indiangrass	5
Panama	Favorable	2,500	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,600	Switchgrass	5
			Indiangrass	5
54 Pocola	Favorable	3,000	Sedge	15
	Normal	2,100	Big bluestem	10
	Unfavorable	1,500	Scribner panicum	10
			Switchgrass	5
			Broadleaf uniola	5
			Cedar elm	5
			Post oak	5
			Sweetgum	5
			Willow oak	5

See footnote at end of table.

TABLE 8.--WOODLAND UNDERSTORY VEGETATION--Continued

Map symbol and soil name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
		Lb/acre		Pct
56: Redport	Favorable	3,400	Sedge	25
	Normal	2,300	Little bluestem	10
	Unfavorable	1,600	Panicum	10
			Beaked panicum	5
			Canada wildrye	5
			Giant cane	5
57: Rexor	Favorable	5,000	Little bluestem	15
	Normal	3,500	Panicum	10
	Unfavorable	2,500	Sedge	10
			Big bluestem	5
			Indiangrass	5
58: Roxana	Favorable	4,500	Little bluestem	15
	Normal	3,600	Big bluestem	10
	Unfavorable	2,000	Canada wildrye	10
			Panicum	10
			Indiangrass	5
			Switchgrass	5
59, 60, 61, 62: Sallisaw	Favorable	2,500	Little bluestem	15
	Normal	1,600	Big bluestem	10
	Unfavorable	1,200	Indiangrass	5
			Switchgrass	5
63: Severn	Favorable	4,500	Little bluestem	15
	Normal	3,000	Big bluestem	10
	Unfavorable	2,000	Canada wildrye	10
			Panicum	10
			Indiangrass	5
			Switchgrass	5
			Sedge	5
			Scribner panicum	5
64*:				
Sherless	Favorable	2,200	Little bluestem	35
	Normal	1,600	Beaked panicum	10
	Unfavorable	1,200	Scribner panicum	10
			Big bluestem	5
Bengal	Favorable	1,500	Little bluestem	15
	Normal	1,200	Big bluestem	10
	Unfavorable	1,000	Indiangrass	5
			Switchgrass	5
65, 66, 67, 68: Shermore	Favorable	2,100	Little bluestem	35
	Normal	1,500	Big bluestem	10
	Unfavorable	1,100	Indiangrass	5
			Switchgrass	5
69: Speer	Favorable	4,000	Little bluestem	15
	Normal	3,100	Sedge	10
	Unfavorable	2,500	Panicum	10
			Big bluestem	5
			Indiangrass	5
			Post oak	5
			Southern red oak	5
			Shortleaf pine	5
			White oak	5
			Sweetgum	5

See footnote at end of table.

TABLE 8.--WOODLAND UNDERSTORY VEGETATION--Continued

Map symbol and soil name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
		Lb/acre		Pct
70:*				
Speer	Favorable	4,000	Little bluestem	15
	Normal	3,100	Sedge	10
	Unfavorable	2,500	Panicum	10
			Big bluestem	5
			Indiangrass	5
			Post oak	5
			Southern red oak	5
			Shortleaf pine	5
			White oak	5
			Sweetgum	5
Neff	Favorable	4,600	Little bluestem	15
	Normal	3,300	Panicum	10
	Unfavorable	2,300	Sedge	10
			Big bluestem	5
			Indiangrass	5
71, 72, 73, 74 Stigler	Favorable	3,500	Big bluestem	20
	Normal	2,500	Little bluestem	15
	Unfavorable	1,800		
75, 76 Tuskahoma	Favorable	1,400	Little bluestem	20
	Normal	900	Big bluestem	10
	Unfavorable	600	Indiangrass	5
			Switchgrass	5
77, 78 Vian	Favorable	3,200	Big bluestem	20
	Normal	2,300	Little bluestem	15
	Unfavorable	1,700	Indiangrass	5
			Switchgrass	5
			Longspike tridens	5
			Panicum	5
			Tickclover	5
			Compassplant	5
			Hickory	5
			Sedge	5
79 Wabbaseka	Favorable	4,500	Big bluestem	10
	Normal	3,600	Switchgrass	15
	Unfavorable	3,000	Indiangrass	15
			Tall dropseed	5
			Sedge	10
			Canadian wildrye	10
80, 81 Wetsaw	Favorable	2,700	Panicum	15
	Normal	1,900	Little bluestem	10
	Unfavorable	1,400	Uniola	10
			Big bluestem	5
			Indiangrass	5
			Lespedeza	5
83, 84, 85 Wister	Favorable	3,000	Big bluestem	25
	Normal	2,100	Indiangrass	15
	Unfavorable	1,500	Little bluestem	10

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1 Bengal	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: large stones.
2:*					
Bengal	Moderate: slope, percs slowly, large stones.	Moderate: slope, percs slowly, large stones.	Severe: slope, large stones.	Moderate: large stones.	Severe: large stones.
Clebit	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, large stones.	Moderate: large stones.	Severe: small stones, thin layer, large stones.
3:*					
Bengal	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.
Octavia	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Severe: slope.	Severe: large stones, slope.
4:*					
Bengal	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Moderate: large stones, slope.	Severe: slope, large stones.
Octavia	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Moderate: large stones, slope.	Severe: large stones, slope.
Tuskahoma	Severe: slope, wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: slope, wetness, depth to rock.	Severe: wetness, erodes easily.	Severe: wetness, slope, thin layer.
5:*					
Bengal	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: thin layer, droughty, slope.
Pirum	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, thin layer.
Clebit	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: depth to rock, thin layer.
6 Carnasaw	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Moderate: large stones.	Severe: large stones.
7 Carnasaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
8:*					
Carnasaw	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Moderate: large stones.	Severe: large stones.
Clebit	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, large stones.	Moderate: large stones.	Severe: small stones, thin layer, large stones.
9,* 10:*					
Carnasaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Octavia	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Severe: slope.	Severe: large stones, slope.
11:*					
Carnasaw	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Moderate: large stones.	Severe: large stones.
Pirum	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: large stones.	Severe: large stones.
12:*					
Carnasaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Pirum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
13:*					
Ceda	Severe: flooding, large stones.	Severe: large stones.	Severe: flooding, large stones.	Moderate: flooding.	Severe: small stones, flooding, droughty.
Rubble land.					
14, 15 Clebit	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, large stones.	Severe: slope.	Severe: slope, thin layer, large stones.
16:*					
Clebit	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, large stones.	Severe: slope.	Severe: slope, thin layer, large stones.
Carnasaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Pirum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
17 Coushatta	Severe: flooding.	Slight	Slight	Severe: erodes easily.	Slight.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
18 Coushatta	Severe: flooding.	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
19 Coushatta	Severe: flooding.	Slight	Moderate: slope.	Slight	Slight.
20 Coushatta	Severe: flooding.	Slight	Slight	Slight	Slight.
21 Cowton	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, depth to rock.	Severe: erodes easily.	Moderate: thin layer, droughty.
22 Cowton	Moderate: percs slowly, slope.	Moderate: percs slowly, slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer, droughty.
23 Crevasse	Severe: flooding.	Slight	Moderate: slope.	Slight	Severe: droughty.
24 Cupco	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
25 Garton	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: erodes easily.	Slight.
26, 27 Kamie	Slight	Slight	Severe: slope.	Slight	Moderate: droughty.
28 Kanima	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
29:*					
Kenn	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: flooding, droughty.
Ceda	Severe: flooding.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones, droughty.
30 Kiomatia	Severe: flooding.	Slight	Slight	Slight	Moderate: droughty.
31 Kiomatia	Severe: flooding.	Moderate: percs slowly.	Moderate: percs slowly.	Slight	Moderate: droughty.
32 Latanier	Severe: flooding, wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.
33 Lela	Severe: flooding, percs slowly, wetness.	Severe: percs slowly.	Severe: percs slowly, wetness.	Severe: erodes easily.	Slight.
34, 35 Lela	Severe: flooding, percs slowly, wetness.	Severe: too clayey, percs slowly, wetness.	Severe: too clayey, percs slowly, wetness.	Severe: too clayey, erodes easily, wetness.	Severe: too clayey.
36 Lynnville Variant	Severe: flooding, wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
37 McKamie	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Slight.
38 McKamie	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
39 Moreland	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, percs slowly.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
40 Moreland	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
41 Moreland	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, flooding, percs slowly.	Severe: wetness.	Severe: wetness, flooding.
42 Neff	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
43:*					
Neff	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Rexor	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
44 Norwood	Severe: flooding.	Slight	Slight	Slight	Slight.
45 Norwood	Severe: flooding.	Slight	Moderate: slope.	Slight	Slight.
46 Norwood	Severe: flooding.	Slight	Slight	Slight	Slight.
47 Octavia	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Moderate: slope.	Severe: large stones, slope.
48:*					
Octavia	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Severe: slope.	Severe: large stones, slope.
Carnasaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
49 Oklared	Severe: flooding.	Slight	Slight	Slight	Slight.
50:*					
Pirum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
50:*					
Carnasaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Caston	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
51,* 52:*					
Pirum	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: thin layer.
Clebit	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Slight	Severe: small stones, thin layer.
53:*					
Pirum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Octavia	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Severe: slope.	Severe: large stones, slope.
Panama	Severe: slope, small stones, large stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope, large stones.	Severe: small stones, large stones, slope.
54 Pocola	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, erodes easily.	Severe: wetness.
55. Psamments					
56 Redport	Severe: flooding.	Slight	Slight	Slight	Slight.
57 Rexor	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
58 Roxana	Severe: flooding.	Slight	Slight	Severe: erodes easily.	Slight.
59, 60, 61 Sallisaw	Slight	Slight	Moderate: slope, small stones.	Severe: erodes easily.	Moderate: small stones.
62 Sallisaw	Moderate: small stones, large stones.	Moderate: small stones, large stones.	Severe: small stones, slope, large stones.	Slight	Moderate: large stones, small stones.
63 Severn	Severe: flooding.	Slight	Slight	Slight	Slight.
64:*					
Sherless	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: small stones, large stones, slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
64:*					
Bengal	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Severe: large stones.
65, 66, 67, 68 Shermore	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: wetness, percs slowly, slope.	Moderate: wetness.	Moderate: wetness, droughty.
69 Speer	Severe: flooding.	Slight	Moderate: flooding, slope.	Slight	Moderate: flooding.
70:*					
Speer	Severe: flooding.	Slight	Moderate: flooding, slope.	Slight	Moderate: flooding.
Neff	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
71, 72, 73, 74 Stigler	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Slight.
75, 76 Tuskahoma	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, wetness, depth to rock.	Severe: wetness, erodes easily.	Severe: wetness, thin layer.
77, 78 Vian	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: erodes easily.	Slight.
79 Wabbaseka	Severe: percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: percs slowly, too clayey.	Severe: too clayey, erodes easily.	Severe: too clayey.
80, 81 Wetsaw	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: small stones, large stones, wetness.
82 Wing	Severe: wetness, excess sodium.	Severe: wetness, excess sodium.	Severe: wetness, excess sodium.	Severe: wetness, erodes easily.	Severe: excess sodium, wetness, droughty.
83, 84, 85 Wister	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1 Bengal	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
2:*										
Bengal	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Clebit	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
3:*										
Bengal	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Octavia	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
4:*										
Bengal	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Octavia	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Tuskahoma	Poor	Poor	Fair	Very poor.	Very poor.	Poor	Very poor.	Poor	Poor	Very poor.
5:*										
Bengal	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Pirum	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Good	Very poor.
Clebit	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
6, 7 Carnasaw	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
8:*										
Carnasaw	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Clebit	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
9,* 10:*										
Carnasaw	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Octavia	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
11:*										
Carnasaw	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Pirum	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for-		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
12:*										
Carnasaw	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Pirum	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
13*:										
Ceda	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
Rubble land.										
14, 15 Clebit	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
16*:										
Clebit	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Carnasaw	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Pirum	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
17, 18, 19 Coushatta	Good	Good	Good	Good	Poor	Poor	Very poor.	Good	Good	Poor.
20 Coushatta	Poor	Fair	Good	Good	Poor	Poor	Very poor.	Fair	Good	Very poor.
21 Cowton	Fair	Good	Good	Good	Fair	Poor	Very poor.	Good	Good	Very poor.
22 Cowton	Fair	Good	Good	Good	Fair	Very poor.	Very poor.	Good	Good	Very poor.
23 Crevasse	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
24 Cupco	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
25 Garton	Good	Good	Good	Good	Poor	Poor	Poor	Good	Good	Poor.
26, 27 Kamie	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
28 Kanima	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
29:*										
Kenn	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ceda	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
30, 31 Kiomatia	Fair	Fair	Good	Fair	Very poor.	Poor	Very poor.	Fair	Fair	Very poor.
32 Latanier	Fair	Fair	Fair	Good	Very poor.	Good	Fair	Fair	Good	Good.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
33----------------- Lela	Fair	Good	Good	Good	Poor	Fair	Fair	Good	Good	Fair.
34, 35------------- Lela	Fair	Fair	Fair	Good	Poor	Fair	Fair	Fair	Good	Poor.
36----------------- Lynnville Variant	Fair	Fair	Fair	Good	Poor	Fair	Fair	Fair	Good	Poor.
37, 38------------- McKamie	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
39, 40------------- Moreland	Fair	Fair	Fair	Good	Poor	Good	Fair	Fair	Good	Good.
41----------------- Moreland	Poor	Fair	Fair	Good	Poor	Good	Fair	Poor	Good	Good.
42----------------- Neff	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
43:*										
Neff---------------	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor
Rexor--------------	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
44----------------- Norwood	Good	Good	Good	Good	Poor	Poor	Very poor.	Good	Good	Very poor.
45----------------- Norwood	Good	Good	Good	Good	Poor	Poor	Very poor.	Good	Good	Very poor.
46----------------- Norwood	Good	Good	Good	Good	Poor	Poor	Very poor.	Good	Good	Very poor.
47----------------- Octavia	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
48*:										
Octavia------------	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Carnasaw-----------	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
49----------------- Oklared	Good	Good	Good	Good	Poor	Poor	Very poor.	Good	Good	Very poor.
50:*										
Pirum--------------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Carnasaw-----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Caston-------------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
51,* 52:*										
Pirum--------------	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Good	Very poor.
Clebit-------------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
53:*										
Pirum--------------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
53:*										
Octavia	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Panama	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
54 Pocola	Fair	Good	Good	Good	Poor	Good	Fair	Good	Good	Fair.
55 Psamments	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Fair	Very poor.
56 Redport	Good	Good	Fair	Good	Poor	Poor	Very poor.	Good	Good	Very poor.
57 Rexor	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
58 Roxana	Good	Good	Good	Good	Poor	Poor	Very poor.	Good	Good	Very poor.
59, 60, 61 Sallisaw	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
62 Sallisaw	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
63 Severn	Good	Good	Good	Good	Poor	Poor	Very poor.	Good	Good	Very poor.
64*:										
Sherless	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Bengal	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
65, 66, 67 Shermore	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
68 Shermore	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
69 Speer	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
70:*										
Speer	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Neff	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
71, 72, 73, 74 Stigler	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
75 Tuskahoma	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
76 Tuskahoma	Very poor.	Poor	Poor	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Very poor.
77 Vian	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
78 Vian	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
79: Wabbaseka	Fair	Fair	Fair	Good	Poor	Poor	Fair	Fair	Good	Poor.
80: Wetsaw	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
81: Wetsaw	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
82: Wing	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Poor.
83, 84, 85: Wister	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1----------------- Bengal	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: low strength, shrink-swell, slope.	Severe: large stones.
2:*						
Bengal-----------	Moderate: slope, depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, shrink-swell.	Severe: large stones.
Clebit-----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: small stones, thin layer, large stones.
3:*						
Bengal-----------	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, slope, shrink-swell.	Severe: slope, large stones.
Octavia----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
4:*						
Bengal-----------	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, slope, shrink-swell.	Severe: slope, large stones.
Octavia----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Tuskahoma--------	Severe: depth to rock, wetness, slope.	Severe: wetness, shrink-swell, slope.	Severe: wetness, depth to rock, slope.	Severe: wetness, shrink-swell, slope.	Severe: shrink-swell, wetness, slope.	Severe: wetness, slope, thin layer.
5:*						
Bengal-----------	Moderate: slope, depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: thin layer, droughty, slope.
Pirum------------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Moderate: slope, thin layer.
Clebit-----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: small stones, thin layer.
6----------------- Carnasaw	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Severe: large stones.
7----------------- Carnasaw	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell, low strength.	Severe: large stones, slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
8:*						
Carnasaw----------	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Severe: large stones.
Clebit-----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: small stones, thin layer, large stones.
9,* 10:*						
Carnasaw----------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell, low strength.	Severe: large stones, slope.
Octavia-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
11:*						
Carnasaw----------	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Severe: large stones.
Pirum-------------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Severe: large stones.
12:*						
Carnasaw----------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell, low strength.	Severe: large stones, slope.
Pirum-------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
13:*						
Ceda--------------	Moderate: flooding, large stones.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: large stones, flooding, droughty.
Rubble land.						
14, 15------------ Clebit	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, thin layer, large stones.
16:*						
Clebit------------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, thin layer, large stones.
Carnasaw----------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell, low strength.	Severe: large stones, slope.
Pirum-------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
17, 18, 19-------- Coushatta	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
20 Coushatta	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.
21 Cowton	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: thin layer, droughty.
22 Cowton	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: slope, thin layer, droughty.
23 Crevasse	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: droughty.
24 Cupco	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness.
25 Garton	Severe: wetness.	Severe: flooding, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, shrink-swell.	Slight.
26, 27 Kamie	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
28 Kanima	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
29:*						
Kenn	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Ceda	Moderate: flooding, small stones.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: small stones, droughty.
30, 31 Kiomatia	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.
32 Latanier	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, shrink-swell.	Severe: too clayey.
33 Lela	Severe: cutbanks cave, wetness.	Severe: flooding, shrink-swell, wetness.	Severe: flooding, shrink-swell, wetness.	Severe: flooding, shrink-swell, wetness.	Severe: low strength, shrink-swell.	Moderate: wetness.
34, 35 Lela	Severe: cutbanks cave, wetness.	Severe: flooding, shrink-swell, wetness.	Severe: flooding, shrink-swell, wetness.	Severe: flooding, shrink-swell, wetness.	Severe: low strength, shrink-swell, wetness.	Severe: too clayey,
36 Lynnville Variant	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Severe: too clayey.
37 McKamie	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
38 McKamie	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
39 Moreland	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness, too clayey.
40 Moreland	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness.
41 Moreland	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
42 Neff	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness.
43:*						
Neff	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
Rexor	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
44, 45, 46 Norwood	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.
47 Octavia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
48:*						
Octavia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Carnasaw	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell, low strength.	Severe: large stones, slope.
49 Oklared	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
50:*						
Pirum	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Carnasaw	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell, low strength.	Severe: large stones, slope.
Caston	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
51,* 52:*						
Pirum	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Moderate: thin layer.
Clebit	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, thin layer.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
53:*						
Pirum	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Octavia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Panama	Severe: large stones, slope.	Severe: large stones, slope.	Severe: large stones, slope.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: small stones, large stones, slope.
54 Pocola	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness.
55. Psamments						
56 Redport	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.
57 Rexor	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
58 Roxana	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
59 Sallisaw	Slight	Slight	Slight	Slight	Slight	Slight.
60, 61 Sallisaw	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
62 Sallisaw	Slight	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones, small stones.
63 Severn	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
64:*						
Sherless	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, thin layer, slope.
Bengal	Moderate: slope, depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: slope, thin layer, droughty.
65 Shermore	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
66, 67 Shermore	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: wetness.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
68 Shermore	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: wetness, droughty.
69 Speer	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
70:*						
Speer	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Neff	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness.
71, 72, 73, 74 Stigler	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Slight.
75 Tuskahoma	Severe: depth to rock, wetness.	Severe: wetness, shrink-swell.	Severe: wetness, depth to rock.	Severe: wetness, shrink-swell, slope.	Severe: wetness.	Severe: wetness, thin layer, droughty.
76 Tuskahoma	Severe: depth to rock, wetness.	Severe: wetness, shrink-swell.	Severe: wetness, depth to rock.	Severe: wetness, shrink-swell, slope.	Severe: shrink-swell, wetness.	Severe: wetness, thin layer, droughty.
77 Vian	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Slight.
78 Vian	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Slight.
79 Wabbaseka	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Severe: too clayey.
80 Wetsaw	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
81 Wetsaw	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Moderate: wetness.
82 Wing	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: excess sodium, wetness, droughty.
83, 84, 85 Wister	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Moderate: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1 Bengal	Severe: depth to rock, percs slowly, slope.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey, slope.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
2:*					
Bengal	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Clebit	Severe: depth to rock.	Severe: depth to rock, slope, seepage.	Severe: depth to rock, seepage, large stones.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones, thin layer.
3:*					
Bengal	Severe: depth to rock, slope, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock, slope, too clayey.	Severe: slope, depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Octavia	Severe: wetness, slope, percs slowly.	Severe: slope, large stones.	Severe: slope.	Severe: slope.	Poor: slope.
4:*					
Bengal	Severe: depth to rock, slope, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock, slope, too clayey.	Severe: slope, depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Octavia	Severe: slope, percs slowly.	Severe: slope, large stones.	Severe: slope.	Severe: slope.	Poor: slope.
Tuskahoma	Severe: depth to rock, wetness, slope.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness, slope.	Severe: depth to rock, wetness, slope.	Poor: area reclaim, too clayey, hard to pack.
5:*					
Bengal	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Pirum	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
Clebit	Severe: depth to rock.	Severe: depth to rock, slope, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones, thin layer.
6 Carnasaw	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
7 Carnasaw	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
8:*					
Carnasaw	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
Clebit	Severe: depth to rock.	Severe: depth to rock, slope, seepage.	Severe: depth to rock, seepage, large stones.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones, thin layer.
9,* 10:*					
Carnasaw	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Octavia	Severe: slope, percs slowly.	Severe: slope, large stones.	Severe: slope.	Severe: slope.	Poor: slope.
11:*					
Carnasaw	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
Pirum	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
12:*					
Carnasaw	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Pirum	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, thin layer, slope.
13*:					
Ceda	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: large stones, seepage.
Rubble land.					
14, 15 Clebit	Severe: depth to rock, slope.	Severe: depth to rock, slope, seepage.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
16:*					
Clebit	Severe: depth to rock, slope.	Severe: depth to rock, slope, seepage.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Carnasaw	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
16:*					
Pirum	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope, thin layer.
17, 18, 19 Coushatta	Moderate: flooding, wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Moderate: flooding.	Fair: too clayey.
20 Coushatta	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
21 Cowton	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
22 Cowton	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
23 Crevasse	Severe: poor filter.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Poor: seepage, too sandy.
24 Cupco	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
25 Garton	Severe: wetness, percs slowly.	Severe: wetness.	Severe: too clayey.	Moderate: flooding, wetness.	Poor: too clayey, hard to pack.
26, 27 Kamie	Moderate: percs slowly.	Severe: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
28 Kanima	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
29:*					
Kenn	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Poor: small stones.
Ceda	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: large stones, seepage.
30, 31 Kiomatia	Severe: poor filter.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Poor: too sandy.
32 Latanier	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
33 Lela	Severe: percs slowly, wetness.	Slight	Severe: too clayey, wetness.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
34, 35 Lela	Severe: percs slowly, wetness.	Slight	Severe: too clayey, wetness.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

See footnote at end of table.

TABLE 12--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
36----------------- Lynnville Variant	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
37----------------- McKamie	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
38----------------- McKamie	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
39, 40------------- Moreland	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
41----------------- Moreland	Severe: flooding, wetness, percs slowly.	Severe: wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
42----------------- Neff	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
43:*					
Neff---------------	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Rexor--------------	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Fair: too clayey, wetness.
44----------------- Norwood	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
45----------------- Norwood	Moderate: flooding, percs slowly.	Moderate: seepage, slope.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
46----------------- Norwood	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
47----------------- Octavia	Severe: slope, percs slowly.	Severe: slope, large stones.	Severe: slope.	Severe: slope.	Poor: slope.
48:*					
Octavia------------	Severe: slope, percs slowly.	Severe: slope, large stones.	Severe: slope.	Severe: slope.	Poor: slope.
Carnasaw-----------	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
49------------------ Oklared	Moderate: wetness, floods.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Good.
50:*					
Pirum---------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope, thin layer.
Carnasaw------------	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Caston--------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
51,* 52:*					
Pirum---------------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
Clebit--------------	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones, thin layer.
53:*					
Pirum---------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope, thin layer.
Octavia-------------	Severe: slope, percs slowly.	Severe: slope, large stones.	Severe: slope.	Severe: slope.	Poor: slope.
Panama--------------	Severe: percs slowly, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: small stones, slope, large stones.
54------------------ Pocola	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
55. Psamments					
56------------------ Redport	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
57------------------ Rexor	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Fair: too clayey, wetness.
58------------------ Roxana	Moderate: flooding, wetness, percs slowly.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: flooding, wetness.	Good.
59, 60, 61---------- Sallisaw	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
62 Sallisaw	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey, slope.	Moderate: slope.	Fair: small stones, slope.
63 Severn	Moderate: flooding.	Severe: seepage, flooding.	Severe: seepage.	Severe: seepage.	Good.
64:*					
Sherless	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
Bengal	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
65, 66, 67, 68 Shermore	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
69 Speer	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
70:*					
Speer	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
Neff	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
71 Stigler	Severe: wetness, percs slowly.	Slight	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
72 Stigler	Severe: wetness, percs slowly.	Moderate: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
73 Stigler	Severe: wetness, percs slowly.	Slight	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
74 Stigler	Severe: wetness, percs slowly.	Moderate: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
75, 76 Tuskahoma	Severe: depth to rock, wetness.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: area reclaim, too clayey, hard to pack.
77, 78 Vian	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
79 Wabbaseka	Moderate: flooding.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
80, 81 Wetsaw	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, small stones, wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
82------------------- Wing	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey, excess sodium.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
83------------------- Wister	Severe: wetness, percs slowly.	Moderate: depth to rock.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
84, 85--------------- Wister	Severe: wetness, percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1 Bengal	Poor: low strength, shrink-swell, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope, too clayey.
2:*				
Bengal	Poor: low strength, shrink-swell, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope, too clayey.
Clebit	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, large stones.
3:*				
Bengal	Poor: low strength, shrink-swell, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope, too clayey.
Octavia	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, small stones, slope.
4:*				
Bengal	Poor: low strength, shrink-swell, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope, too clayey.
Octavia	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, small stones, slope.
Tuskahoma	Poor: area reclaim, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, thin layer, wetness.
5:*				
Bengal	Poor: low strength, shrink-swell, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Pirum	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
Clebit	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, thin layer.
6 Carnasaw	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, too clayey.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
7------------------- Carnasaw	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, too clayey.
8:*				
Carnasaw-------------	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, too clayey.
Clebit---------------	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, thin layer.
9:* 10:*				
Carnasaw-------------	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, too clayey.
Octavia--------------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, small stones, slope.
11:*				
Carnasaw-------------	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey.
Pirum----------------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
12:*				
Carnasaw-------------	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, too clayey.
Pirum----------------	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
13:*				
Ceda-----------------	Fair: large stones.	Improbable: small stones.	Probable-------------	Poor: large stones, area reclaim.
Rubble land.				
14, 15--------------- Clebit	Poor: area reclaim, slope, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
16:*				
Clebit---------------	Poor: area reclaim, slope, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Carnasaw-------------	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, too clayey.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
16:*				
Pirum	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
17, 18 Coushatta	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
19 Coushatta	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
20 Coushatta	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
21, 22 Cowton	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
23 Crevasse	Good	Probable	Improbable: too sandy.	Fair: too sandy.
24 Cupco	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
25 Garton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
26, 27 Kamie	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
28 Kanima	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
29:*				
Kenn	Fair: shrink-swell.	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
Ceda	Fair: large stones.	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
30, 31 Kiomatia	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
32 Latanier	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
33 Lela	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
34, 35 Lela	Poor: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
36 Lynnville Variant	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
37, 38 McKamie	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
39 Moreland	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
40, 41 Moreland	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, too clayey.
42 Neff	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
43:*				
Neff	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Rexor	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
44, 45 Norwood	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
46 Norwood	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
47 Octavia	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, small stones, slope.
48:*				
Octavia	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, small stones, slope.
Carnasaw	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, too clayey.
49 Oklared	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
50:*				
Pirum	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Carnasaw	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey, small stones.
Caston	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, area reclaim.
51,* 52:*				
Pirum	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
51,* 52:*				
Clebit	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, thin layer.
53:*				
Pirum	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Octavia	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, small stones, slope.
Panama	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: slope, small stones, large stones.
54 Pocola	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, too clayey.
55. Psamments				
56 Redport	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
57 Rexor	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
58 Roxana	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
59, 60, 61 Sallisaw	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
62 Sallisaw	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
63 Severn	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
64:*				
Sherless	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
Bengal	Poor: low strength, shrink-swell, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
65, 66, 67, 68 Shermore	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
69 Speer	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
70:*				
Speer	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
70:* Neff	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
71, 72, 73, 74 Stigler	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too layer.
75 Tuskahoma	Poor: area reclaim, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, wetness, thin layer.
76 Tuskahoma	Poor: area reclaim, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, thin layer, wetness.
77, 78 Vian	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
79 Wabbaseka	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
80, 81 Wetsaw	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim, too clayey.
82 Wing	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess sodium, too clayey.
83, 84, 85 Wister	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
1 Bengal	Severe: slope.	Moderate: thin layer, hard to pack.	Severe: no water.	Deep to water	Large stones, slope, depth to rock.	Large stones, slope, droughty.
2:*						
Bengal	Severe: slope.	Moderate: thin layer, hard to pack.	Severe: no water.	Deep to water	Large stones, slope, depth to rock.	Large stones, slope, droughty.
Clebit	Severe: depth to rock, slope, seepage.	Severe: thin layer, large stones.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
3:*						
Bengal	Severe: slope.	Moderate: thin layer, hard to pack.	Severe: no water.	Deep to water	Large stones, slope, depth to rock.	Large stones, slope, droughty.
Octavia	Severe: slope.	Moderate: piping, large stones.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope.
4:*						
Bengal	Severe: slope.	Moderate: thin layer, hard to pack.	Severe: no water.	Deep to water	Large stones, slope, depth to rock.	Large stones, slope, droughty.
Octavia	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope.
Tuskahoma	Severe: depth to rock, slope.	Severe: thin layer, wetness.	Severe: no water.	Percs slowly, depth to rock, slope.	Slope, depth to rock, erodes easily.	Wetness, slope, erodes easily.
5:*						
Bengal	Severe: slope.	Moderate: thin layer, hard to pack.	Severe: no water.	Deep to water	Slope, depth to rock, percs slowly.	Slope, depth to rock, droughty.
Pirum	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Clebit	Severe: depth to rock, slope, seepage.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Depth to rock, slope, droughty.
6, 7 Carnasaw	Severe: slope.	Moderate: large stones, thin layer, hard to pack.	Severe: no water.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, percs slowly.
8:*						
Carnasaw	Severe: slope.	Moderate: large stones, thin layer, hard to pack.	Severe: no water.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, percs slowly.
Clebit	Severe: depth to rock, slope, seepage.	Severe: thin layer, large stones.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
9,* 10:*						
Carnasaw	Severe: slope.	Moderate: large stones, thin layer, hard to pack.	Severe: no water.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, percs slowly.
Octavia	Severe: slope.	Moderate: piping, large stones.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope.
11:*						
Carnasaw	Severe: slope.	Moderate: large stones, thin layer, hard to pack.	Severe: no water.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, percs slowly.
Pirum	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
12:*						
Carnasaw	Severe: slope.	Moderate: large stones, thin layer, hard to pack.	Severe: no water.	Deep to water	Slope, large stones, erodes easily.	Slope, large stones, erodes easily.
Pirum	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
13:*						
Ceda	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones	Droughty, large stones.
Rubble land.						
14, 15 Clebit	Severe: depth to rock, slope, seepage.	Severe: thin layer, large stones.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
16:*						
Clebit	Severe: depth to rock, slope, seepage.	Severe: thin layer, large stones.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Carnasaw	Severe: slope.	Moderate: thin layer, hard to pack.	Severe: no water.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, percs slowly.
Pirum	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
17, 18, 19 Coushatta	Moderate: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Complex slope	Complex slope.
20 Coushatta	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Complex slope	Complex slope.
21 Cowton	Moderate: depth to rock, slope.	Moderate: thin layer, hard to pack.	Severe: no water.	Deep to water	Depth to rock, erodes easily.	Depth to rock, droughty, erodes easily.
22 Cowton	Severe: slope.	Moderate: thin layer, hard to pack.	Severe: no water.	Deep to water	Depth to rock, erodes easily, slope.	Slope, droughty, erodes easily.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
23 Crevasse	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy	Droughty.
24 Cupco	Slight	Severe: wetness.	Severe: no water.	Flooding	Wetness	Wetness.
25 Garton	Slight	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly	Erodes easily, wetness, percs slowly.	Erodes easily, percs slowly.
26, 27 Kamie	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Favorable	Favorable.
28 Kanima	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope	Slope, droughty.
29:*						
Kenn	Moderate: seepage.	Moderate: piping, large stones.	Severe: no water.	Deep to water	Large stones	Large stones.
Ceda	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones	Droughty, large stones.
30, 31 Kiomatia	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Too sandy	Droughty.
32 Latanier	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.
33, 34, 35 Lela	Slight	Severe: wetness.	Severe: no water.	Percs slowly	Erodes easily, percs slowly, wetness.	Erodes easily, percs slowly, wetness.
36 Lynnville Variant	Slight	Severe: piping, wetness.	Moderate: deep to water.	Percs slowly, flooding.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
37 McKamie	Moderate: seepage, slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Percs slowly	Percs slowly.
38 McKamie	Severe: slope.	Moderate: thin layer, hard to pack.	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, percs slowly.
39, 40 Moreland	Slight	Severe: hard to pack, wetness.	Severe: no water.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.
41 Moreland	Slight	Severe: hard to pack, wetness.	Severe: no water.	Percs slowly, flooding.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
42 Neff	Slight	Severe: wetness.	Severe: no water.	Flooding	Wetness	Wetness.
43:*						
Neff	Slight	Severe: wetness.	Severe: no water.	Flooding	Wetness	Wetness.
Rexor	Moderate: seepage.	Slight	Severe: no water.	Deep to water	Complex slope	Complex slope.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
44, 45, 46: Norwood	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
47: Octavia	Severe: slope.	Moderate: piping, large stones.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope.
48:*						
Octavia	Severe: slope.	Moderate: piping, large stones.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope.
Carnasaw	Severe: slope.	Moderate: large stones, thin layer.	Severe: no water.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, percs slowly.
49: Oklared	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Deep to water	Complex slope	Complex slope.
50:*						
Pirum	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Carnasaw	Severe: slope.	Moderate: large stones, thin layer.	Severe: no water.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, percs slowly.
Caston	Severe: slope.	Moderate: large stones.	Severe: no water.	Deep to water	Slope, large stones.	Slope, droughty, large stones.
51,* 52:*						
Pirum	Moderate: seepage, depth to rock.	Severe: piping.	Severe: no water.	Deep to water	Depth to rock	Depth to rock.
Clebit	Severe: depth to rock, seepage.	Severe: thin layer.	Severe: no water.	Deep to water	Depth to rock	Droughty, depth to rock.
53:*						
Pirum	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Octavia	Severe: slope.	Moderate: piping, large stones.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope.
Panama	Severe: slope.	Severe: large stones.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
54: Pocola	Slight	Severe: wetness.	Severe: no water.	Percs slowly, flooding.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
55. Psamments						
56: Redport	Moderate: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Favorable	Favorable.
57: Rexor	Moderate: seepage.	Slight	Severe: no water.	Deep to water	Complex slope	Complex slope.
58: Roxana	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
59----------------- Sallisaw	Moderate: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Favorable-------	Favorable.
60, 61------------ Sallisaw	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Favorable-------	Favorable.
62----------------- Sallisaw	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope-----------	Slope.
63----------------- Severn	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Complex slope	Complex slope.
64:*						
Sherless----------	Severe: slope.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Bengal------------	Severe: slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty.
65----------------- Shermore	Moderate: seepage.	Moderate: piping, wetness.	Severe: no water.	Favorable-------	Wetness, rooting depth.	Droughty, rooting depth.
66, 67, 68-------- Shermore	Moderate: seepage, slope.	Moderate: piping, wetness.	Severe: no water.	Slope-----------	Wetness, rooting depth.	Droughty, rooting depth.
69----------------- Speer	Moderate: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Complex slope	Complex slope.
70:*						
Speer-------------	Moderate: seepage.	Moderate:	Severe: no water.	Deep to water	Complex slope	Complex slope.
Neff--------------	Slight----------	Severe: wetness.	Severe: no water.	Flooding--------	Wetness---------	Wetness.
71, 72, 73, 74---- Stigler	Slight----------	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly---	Erodes easily, wetness, percs slowly.	Erodes easily, percs slowly.
75, 76------------ Tuskahoma	Severe: depth to rock, slope.	Severe: thin layer, wetness.	Severe: no water.	Percs slowly, depth to rock, slope.	Slope, depth to rock, erodes easily.	Wetness, slope, erodes easily.
77----------------- Vian	Slight----------	Moderate: piping, wetness.	Severe: no water.	Favorable-------	Erodes easily, wetness.	Erodes easily.
78----------------- Vian	Moderate: slope.	Moderate: piping, wetness.	Severe: no water.	Slope-----------	Erodes easily, wetness.	Erodes easily.
79----------------- Wabbaseka	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily, percs slowly.
80----------------- Wetsaw	Slight----------	Severe: wetness.	Slight----------	Favorable-------	Wetness---------	Favorable.
81----------------- Wetsaw	Moderate: slope.	Severe: wetness.	Slight----------	Slope-----------	Wetness---------	Favorable.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
82----------------- Wing	Slight---------	Severe: hard to pack, wetness, excess sodium.	Severe: no water.	Percs slowly, excess sodium.	Erodes easily, wetness, percs slowly.	Wetness, excess sodium, erodes easily.
83, 84------------ Wister	Moderate: depth to rock.	Moderate: thin layer, hard to pack, wetness.	Severe: no water.	Percs slowly---	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
85----------------- Wister	Moderate: depth to rock, slope.	Moderate: thin layer, hard to pack, wetness.	Severe: no water.	Percs slowly, slope.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1----------------- Bengal	0-7	Stony fine sandy loam.	SM, ML, SM-SC	A-2, A-4	10-55	85-90	85-90	70-85	30-55	<26	NP-7
	7-30	Clay, silty clay	CL, CH	A-7	0	85-100	85-100	75-100	75-99	41-60	18-34
	30-36	Clay, silty clay, shaly clay.	CL, CH	A-7	0	55-100	55-100	55-100	50-99	41-60	18-34
	36-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
2:* Bengal-----------	0-7	Stony fine sandy loam.	SM, ML, SM-SC	A-2, A-4	10-55	85-90	85-90	70-85	30-55	<26	NP-7
	7-30	Clay, silty clay	CL, CH	A-7	0	85-100	85-100	75-100	75-99	41-60	18-34
	30-36	Clay, silty clay, shaly clay.	CL, CH	A-7	0	55-100	55-100	55-100	50-99	41-60	18-34
	36-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
Clebit-----------	0-4	Stony fine sandy loam.	GM, GM-GC	A-1, A-2	15-40	35-50	35-50	30-50	13-30	<26	NP-7
	4-15	Stony loam, stony fine sandy loam, bouldery fine sandy loam.	GM, GC, GM-GC	A-1, A-2, A-4, A-6	15-40	35-50	35-50	30-50	13-45	<35	NP-13
	15-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
3:* Bengal-----------	0-7	Stony fine sandy loam.	SM, ML, SM-SC	A-2, A-4	10-55	85-90	85-90	70-85	30-55	<26	NP-7
	7-30	Clay, silty clay	CL, CH	A-7	0	85-100	85-100	75-100	75-99	41-60	18-34
	30-36	Clay, silty clay, shaly clay.	CL, CH	A-7	0	55-100	55-100	55-100	50-99	41-60	18-34
	36-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
Octavia----------	0-18	Stony loam	CL, SC	A-6, A-4	25-40	60-90	60-90	50-90	40-75	30-35	9-13
	18-48	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-15	60-90	60-90	50-90	20-80	25-40	8-18
	48-65	Clay loam, clay, shaly clay loam.	CL, CH, SC	A-6, A-7	0-30	55-90	55-90	50-90	45-85	37-60	16-34
4:* Bengal-----------	0-7	Stony fine sandy loam.	SM, ML, SM-SC	A-2, A-4	10-55	85-90	85-90	70-85	30-55	<26	NP-7
	7-30	Clay, silty clay	CL, CH	A-7	0	85-100	85-100	75-100	75-99	41-60	18-34
	30-36	Clay, silty clay, shaly clay.	CL, CH	A-7	0	55-100	55-100	55-100	50-99	41-60	18-34
	36-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
Octavia----------	0-18	Stony fine sandy loam.	ML, SM, CL-ML, SM-SC	A-2, A-4	25-40	60-90	60-90	50-90	20-55	<26	NP-7
	18-48	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-15	60-90	60-90	50-90	20-80	25-40	8-18
	48-65	Clay loam, clay, shaly clay loam.	CL, CH, SC	A-6, A-7	0-30	55-90	55-90	50-90	45-85	37-60	16-34

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
4:*											
Tuskahoma	0-5	Stony loam	CL, ML, CL-ML	A-4	0-30	85-100	85-100	75-100	55-97	22-31	2-10
	5-10	Clay, silty clay, silty clay loam.	CL, CH	A-6, A-7	0	55-100	55-100	50-100	50-99	37-60	15-34
	10-15	Shaly clay, shaly silty clay, shaly silty clay loam.	GC, CL, CH	A-2, A-6, A-7	0	35-70	35-70	35-70	30-70	37-60	15-34
	15-30	Weathered bedrock	---	---	---	---	---	---	---	---	---
5:*											
Bengal	0-7	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0	85-90	85-90	70-85	30-55	<26	NP-7
	7-30	Clay, silty clay	CL, CH	A-7	0	85-100	85-100	80-100	75-99	41-60	18-34
	30-36	Clay, silty clay, shaly clay.	CL, CH	A-7	0	55-100	55-100	55-100	50-99	41-60	18-34
	36-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pirum	0-6	Fine sandy loam	SM, ML	A-4	0	75-100	75-100	70-90	35-65	<20	NP-3
	6-30	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0	75-100	75-100	70-90	50-70	22-35	5-15
	30-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Clebit	0-4	Fine sandy loam	GM, GM-GC	A-1, A-2, A-4	0-15	35-50	35-50	30-50	13-30	<26	NP-7
	4-15	Very gravelly loam, very gravelly fine sandy loam.	GM, GC, GM-GC	A-1, A-2, A-4, A-6	0-15	35-50	35-50	30-50	13-45	<35	NP-13
	15-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
6, 7 Carnasaw	0-8	Stony loam	CL, SC, SM, ML	A-4, A-6	25-40	85-95	85-95	75-90	40-75	26-37	3-14
	8-12	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	70-95	37-65	18-35
	12-43	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	80-95	70-95	41-65	18-35
	43-51	Gravelly silty clay, gravelly clay, clay.	CL, CH	A-7	0-10	55-90	55-90	55-90	50-90	41-65	18-35
	51-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
8:*											
Carnasaw	0-8	Stony loam	CL, SC, SM, ML	A-4, A-6	25-40	85-95	85-95	75-90	40-75	26-37	3-14
	8-12	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	70-95	37-65	18-35
	12-43	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	80-95	70-95	41-65	18-35
	43-51	Gravelly silty clay, gravelly clay, clay.	CL, CH	A-7	0-10	55-90	55-90	55-90	50-90	41-65	18-35
	51-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Clebit	0-4	Stony fine sandy loam.	GM, GM-GC	A-1, A-2	15-40	35-50	35-50	30-50	13-30	<26	NP-7
	4-15	Stony loam, stony fine sandy loam, bouldery fine sandy loam.	GM, GC, GM-GC	A-1, A-2, A-4, A-6	15-40	35-50	35-50	30-50	13-45	<35	NP-13
	15-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
9,* 10:*											
Carnasaw	0-8	Stony loam	CL, SC, SM, ML	A-4, A-6	25-40	85-95	85-95	75-90	40-75	26-37	3-14
	8-12	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	70-95	37-65	18-35
	12-43	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	80-95	70-95	41-65	18-35
	43-51	Gravelly silty clay, gravelly clay, clay.	CL, CH	A-7	0-10	55-90	55-90	55-90	50-90	41-65	18-35
	51-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Octavia	0-18	Stony loam	CL, SC	A-4, A-6	25-40	60-90	60-90	55-90	40-75	30-35	9-13
	18-48	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-15	60-90	60-90	50-90	20-80	25-40	8-18
	48-65	Clay loam, clay, shaly clay loam.	CL, CH, SC	A-6, A-7	0-30	55-90	55-90	50-90	45-85	37-60	16-34
11,* 12:*											
Carnasaw	0-8	Stony loam	CL, SC, SM, ML	A-4, A-6	25-40	85-95	85-95	75-90	40-75	26-37	3-14
	8-12	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	70-95	37-65	18-35
	12-43	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	80-95	70-95	41-65	18-35
	43-51	Gravelly silty clay, gravelly clay, clay.	CL, CH	A-7	0-10	55-90	55-90	55-90	50-90	41-65	18-35
	51-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pirum	0-6	Stony fine sandy loam.	SM, ML	A-4	10-35	75-100	75-100	70-90	36-65	<20	NP-3
	6-30	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0-10	75-100	75-100	70-90	50-70	22-35	5-15
	30-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
13:*											
Ceda	0-8	Stony loam	SM, GM, ML, GM-GC	A-1, A-2, A-4	5-25	35-75	35-75	35-65	20-65	22-29	2-7
	8-65	Cobbly loam, very cherty loam, gravelly fine sandy loam.	GM, GP-GM, GM-GC, GC	A-1, A-2, A-4, A-6	5-30	15-50	15-50	10-50	5-45	<40	NP-18
Rubble land.											
14, 15 Clebit	0-4	Stony fine sandy loam.	GM, GM-GC	A-1, A-2	15-40	35-50	35-50	30-50	13-30	<26	NP-7
	4-15	Stony loam, stony fine sandy loam, bouldery fine sandy loam.	GM, GC, GM-GC	A-1, A-2, A-4, A-6	15-40	35-50	35-50	30-50	13-45	<35	NP-13
	15-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
16:*											
Clebit	0-4	Stony fine sandy loam.	GM, GM-GC	A-1, A-2	15-40	35-50	35-50	30-50	13-30	<26	NP-7
	4-15	Stony loam, stony fine sandy loam, bouldery fine sandy loam.	GM, GC, GM-GC	A-1, A-2, A-4, A-6	15-40	35-50	35-50	30-50	13-45	<35	NP-13
	15-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
16:*											
Carnasaw----------	0-8	Stony loam--------	CL, SC, SM, ML	A-4, A-6	25-40	85-95	85-95	75-90	40-75	26-37	3-14
	8-12	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	70-95	37-65	18-35
	12-43	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	80-95	70-95	41-65	18-35
	43-51	Gravelly silty clay, gravelly clay, clay.	CL, CH	A-7	0-10	55-90	55-90	55-90	50-90	41-65	18-35
	51-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pirum------------	0-6	Stony fine sandy loam.	SM, ML	A-4	10-35	75-100	75-100	70-90	36-65	<20	NP-3
	6-30	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0-10	75-100	75-100	70-90	50-70	22-35	5-15
	30-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
17, 18------------ Coushatta	0-15	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	100	70-100	<30	NP-10
	15-35	Silt loam, silty clay loam.	CL	A-6	0	100	100	100	90-100	28-40	12-20
	35-63	Silt loam, silty clay loam, very fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	100	70-100	<40	NP-20
19---------------- Coushatta	0-15	Silty clay loam	CL	A-6	0	100	100	100	90-100	34-40	15-20
	15-35	Silt loam, silty clay loam.	CL	A-6	0	100	100	100	90-100	28-40	12-20
	35-63	Silt loam, silty clay loam, very fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	100	70-100	<40	NP-20
20---------------- Coushatta	0-16	Loamy fine sand	SP-SM, SM	A-2-4, A-3	0	100	95-100	80-98	6-20	---	NP
	16-36	Silt loam, silty clay loam.	CL	A-6	0	100	100	100	90-100	28-40	12-20
	36-60	Silt loam, silty clay loam, very fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	100	70-100	<40	NP-20
21, 22------------ Cowton	0-8	Loam--------------	ML, CL, SM	A-4, A-6	0	70-100	70-100	60-100	45-97	22-37	2-14
	8-14	Clay loam, silty clay loam, gravelly clay loam.	CL, GC, SC	A-6, A-7	0-20	55-100	55-100	50-100	45-98	33-50	12-26
	14-34	Silty clay, clay, clay loam.	CL, CH	A-6, A-7	0	60-100	60-100	55-100	50-99	37-60	15-34
	34-40	Unweathered rock	---	---	---	---	---	---	---	---	---
23---------------- Crevasse	0-12	Loamy fine sand	SM	A-2	0	100	95-100	60-100	15-30	---	NP
	12-65	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2, A-3	0	100	95-100	50-100	5-20	---	NP
24---------------- Cupco	0-21	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	96-100	80-97	25-37	5-13
	21-55	Silty clay loam	CL	A-6, A-7	0	100	100	98-100	90-98	33-42	12-19
	55-83	Silty clay loam, clay loam.	CL	A-6, A-7	0	100	100	96-100	80-98	33-43	12-20
25---------------- Garton	0-6	Silty clay loam	CL	A-6, A-7	0	100	100	98-100	90-98	33-42	12-19
	6-51	Silty clay loam, clay, silty clay.	CL, CH	A-6, A-7	0	100	100	96-100	80-99	37-60	15-33
	51-63	Loam, clay loam	CL	A-4, A-6, A-7	0	98-100	98-100	96-100	75-90	30-45	9-21

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
26---------------- Kamie	0-15	Loamy fine sand	SM	A-2	0	100	98-100	90-100	15-35	---	NP
	15-43	Sandy clay loam, clay loam.	CL, SC, CL-ML, SM-SC	A-4, A-6	0	100	100	90-100	36-90	25-40	7-18
	43-64	Fine sandy loam, sandy clay loam.	SM, ML, SC, CL	A-4, A-6	0	100	98-100	90-100	36-65	<37	NP-16
27---------------- Kamie	0-7	Loamy fine sand	SM	A-2	0	100	98-100	90-100	15-35	---	NP
	7-50	Sandy clay loam, clay loam.	CL, SC, CL-ML, SM-SC	A-4, A-6	0	100	100	90-100	36-90	25-40	7-18
	50-75	Fine sandy loam, sandy clay loam.	SM, ML, SC, CL	A-4, A-6	0	100	98-100	90-100	36-65	<37	NP-16
28---------------- Kanima	0-6	Shaly silty clay loam.	CL, SC	A-6	0-10	50-75	50-75	50-75	40-75	33-40	12-18
	6-75	Very shaly clay loam, very shaly silty clay loam, very shaly loam.	GC, GP-GC	A-2, A-4, A-6	0-10	5-50	5-50	5-50	5-49	30-40	8-18
29:*											
Kenn-------------	0-7	Loam--------------	ML, CL, SM, SC	A-4, A-6	0	75-90	75-90	65-90	35-75	24-35	3-13
	7-29	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-15	50-90	50-90	35-90	15-80	25-40	8-18
	29-45	Very gravelly sandy clay loam, very gravelly clay loam, cobbly sandy clay loam.	GC, GP-GC	A-2, A-4, A-6	0-55	25-50	25-50	20-50	10-45	25-40	8-18
	45-70	Cobbly loam, very gravelly loam, very gravelly fine sandy loam.	GC, GM, GP-GC, GP-GM	A-1, A-2, A-4	15-65	15-50	15-50	10-50	5-45	<31	NP-10
Ceda-------------	0-8	Cobbly loam-------	SM, GM, ML, GM-GC	A-1, A-2, A-4	5-25	35-75	35-75	35-65	20-65	22-29	2-7
	8-65	Cobbly loam, very cherty loam, gravelly fine sandy loam.	GM, GP-GM, GM-GC, GC	A-1, A-2, A-4, A-6	5-30	15-50	15-50	10-50	5-45	<40	NP-18
30---------------- Kiomatia	0-9	Fine sandy loam	SM, SM-SC	A-4, A-2-4	0	100	95-100	80-100	30-45	<26	NP-7
	9-60	Stratified fine sand to loam.	SM, SM-SC	A-2-4	0	100	95-100	80-90	13-30	<22	NP-5
31---------------- Kiomatia	0-11	Silty clay loam	CL	A-6, A-7-6	0	100	95-100	90-100	85-95	35-45	16-25
	11-65	Stratified fine sand to loam.	SM, SM-SC	A-2-4	0	100	95-100	80-90	13-30	<22	NP-5
32---------------- Latanier	0-7	Silty clay--------	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	7-31	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	31-86	Silt loam, silty clay loam, very fine sandy loam.	CL-ML, CL, ML	A-4, A-6	0	100	100	100	80-100	<40	NP-17
33---------------- Lela	0-10	Very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	0	100	100	94-100	65-97	22-31	3-12
	10-70	Silty clay, clay	CL, CH	A-7	0	100	100	96-100	90-99	41-70	20-38
34, 35------------ Lela	0-20	Silty clay--------	CH	A-7	0	100	100	100	95-100	51-45	26-45
	20-70	Silty clay, clay	CL, CH	A-7	0	100	100	96-100	90-99	41-70	20-38

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
36------------ Lynnville Variant	0-10	Silty clay--------	CH, CL	A-7	0	100	100	95-100	85-95	44-75	22-45
	10-75	Silt loam, silty clay loam.	CL	A-6	0	100	100	94-100	70-100	30-40	10-19
37------------ McKamie	0-5	Loam-------------	SM, ML, CL-ML, SM-SC	A-4	0	100	100	90-100	40-80	<30	NP-7
	5-44	Clay, silty clay	CH, CL	A-7-6	0	100	100	95-100	80-100	45-70	22-40
	44-63	Silty clay loam, silt loam, very fine sandy loam.	CL, CL-ML	A-4, A-6	0	100	94-100	88-100	50-95	20-40	5-22
38------------ McKamie	0-3	Loam-------------	SM, ML, CL-ML, SM-SC	A-4	0	100	100	90-100	40-80	<30	NP-7
	3-36	Clay, silty clay	CH, CL	A-7-6	0	100	100	95-100	80-100	45-70	22-40
	36-65	Silty clay loam, silt loam, very fine sandy loam.	CL, CL-ML	A-4, A-6	0	100	94-100	88-100	50-95	20-40	5-22
39------------ Moreland	0-15	Silty clay--------	CH	A-7-6	0	100	95-100	90-100	90-100	51-74	25-45
	15-42	Clay, silty clay	CH	A-7-6	0	100	95-100	90-100	90-100	51-74	25-45
	42-63	Clay, silty clay loam, silty clay.	CH, CL	A-7-6, A-6	0	100	100	100	90-100	35-74	25-45
40, 41--------- Moreland	0-15	Silty clay loam	CL	A-6, A-7-6	0	100	100	100	90-100	30-50	12-25
	15-42	Clay, silty clay	CH	A-7-6	0	100	95-100	90-100	90-100	51-74	25-45
	42-63	Clay, silty clay loam, silty clay.	CH, CL	A-7-6, A-6	0	100	100	100	90-100	35-74	25-45
42------------ Neff	0-23	Silt loam--------	CL	A-4, A-6	0	100	100	96-100	65-97	30-37	8-14
	23-57	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	96-100	80-98	30-42	11-19
	57-82	Silt loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	100	96-100	80-98	30-42	8-19
43:*											
Neff----------	0-23	Silt loam--------	CL	A-4, A-6	0	100	100	96-100	65-97	30-37	8-14
	23-57	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	96-100	80-98	30-42	11-19
	57-82	Silt loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	100	96-100	80-98	30-42	8-19
Rexor---------	0-10	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	98-100	98-100	96-100	65-97	22-37	3-14
	10-65	Clay loam, silt loam, silty clay loam.	CL	A-4, A-6	0	98-100	98-100	96-100	80-98	30-40	8-17
44, 45--------- Norwood	0-9	Silty clay loam	CL, CH	A-6, A-7	0	100	100	95-100	85-98	30-55	15-35
	9-25	Silt loam, silty clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	90-100	60-98	25-46	7-26
	25-68	Silt loam, very fine sandy loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6, A-7	0	100	100	90-100	70-98	20-45	2-25
46------------ Norwood	0-9	Loam-------------	CL, CL-ML	A-4, A-6	0	100	100	95-100	51-90	20-35	4-15
	9-25	Silt loam, silty clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	90-100	60-98	25-46	7-26
	25-68	Silt loam, very fine sandy loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6, A-7	0	100	100	90-100	70-98	20-45	2-25

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
47---------------- Octavia	0-18	Stony loam--------	CL, SC	A-4, A-6	25-40	60-90	60-90	55-90	40-75	30-35	9-13
	18-48	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-15	60-90	60-90	50-90	20-80	25-40	8-18
	48-65	Clay loam, clay, shaly clay loam.	CL, CH, SC	A-6, A-7	0-30	55-90	55-90	50-90	45-85	37-60	16-34
48:*											
Octavia----------	0-18	Stony loam--------	CL, SC	A-4, A-6	25-40	60-90	60-90	55-90	40-75	30-35	9-13
	18-48	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-15	60-90	60-90	50-90	20-80	25-40	8-18
	48-65	Clay loam, clay, shaly clay loam.	CL, CH, SC	A-6, A-7	0-30	55-90	55-90	50-90	45-85	37-60	16-34
Carnasaw---------	0-8	Stony loam--------	CL, SC, SM, ML	A-4, A-6	25-40	85-95	85-95	75-90	40-75	26-37	3-14
	8-12	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	70-95	37-65	18-35
	12-43	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	80-95	70-95	41-65	18-35
	43-51	Gravelly silty clay, gravelly clay, clay.	CL, CH	A-7	0-10	55-90	55-90	55-90	50-90	41-65	18-35
	51-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
49---------------- Oklared	0-6	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	100	98-100	94-100	36-60	<26	NP-7
	6-32	Fine sandy loam, very fine sandy loam, loam.	SM, SC, ML, CL	A-4	0	100	98-100	94-100	36-85	<30	NP-10
	32-63	Stratified fine sandy loam to loamy fine sand.	SM, SC, ML, CL	A-2, A-4	0	100	98-100	90-100	15-60	<30	NP-10
50:*											
Pirum------------	0-6	Stony fine sandy loam.	SM, ML	A-4	10-35	75-100	75-100	70-90	36-65	<20	NP-3
	6-30	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0-10	75-100	75-100	70-90	50-70	22-35	5-15
	30-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Carnasaw---------	0-8	Stony loam--------	CL, SC, SM, ML	A-4, A-6	25-40	85-95	85-95	75-90	40-75	26-37	3-14
	8-12	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	70-95	37-65	18-35
	12-43	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	80-95	70-95	41-65	18-35
	43-51	Gravelly silty clay, gravelly clay, clay.	CL, CH	A-7	0-10	55-90	55-90	55-90	50-90	41-65	18-35
	51-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Caston-----------	0-10	Stony fine sandy loam.	GM, SM, GM-GC, SM-SC	A-2, A-4, A-1	5-15	40-70	40-70	30-60	14-42	<26	NP-7
	10-22	Gravelly loam, very gravelly loam, very gravelly fine sandy loam.	GM, GC, SM, SC	A-2, A-4, A-6, A-1	5-15	25-60	25-60	15-55	9-49	20-35	NP-13
	22-80	Gravelly clay loam, very gravelly sandy clay loam.	CL, GC	A-2, A-4, A-6	5-15	25-45	25-45	15-45	9-40	25-40	8-18

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
51:*											
Pirum-----------	0-6	Fine sandy loam	SM, ML	A-4	0	75-100	75-100	70-90	35-65	<20	NP-3
	6-30	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0	75-100	75-100	70-90	50-70	22-35	5-15
	30-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Clebit----------	0-4	Fine sandy loam	GM, GM-GC	A-1, A-2, A-4	0-15	35-50	35-50	30-50	13-30	<26	NP-7
	4-15	Very gravelly loam, very gravelly fine sandy loam.	GM, GC, GM-GC	A-1, A-2, A-4, A-6	0-15	35-50	35-50	30-50	13-45	<35	NP-13
	15-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
52:*											
Pirum-----------	0-4	Fine sandy loam	SM, ML	A-4	0	75-100	75-100	70-90	35-65	<20	NP-3
	4-30	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0	75-100	75-100	70-90	50-70	22-35	5-15
	30-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Clebit----------	0-4	Fine sandy loam	GM, GM-GC	A-1, A-2, A-4	0-15	35-50	35-50	30-50	13-30	<26	NP-7
	4-10	Very gravelly loam, very gravelly fine sandy loam.	GM, GC, GM-GC	A-1, A-2, A-4, A-6	0-15	35-50	35-50	30-50	13-45	<35	NP-13
	10-13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
53:*											
Pirum-----------	0-6	Stony fine sandy loam.	SM, ML	A-4	10-35	75-100	75-100	70-90	36-65	<20	NP-3
	6-30	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0-10	75-100	75-100	70-90	50-70	22-35	5-15
	30-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Octavia---------	0-18	Stony fine sandy loam.	ML, SM, CL-ML, SM-SC	A-2, A-4	25-40	60-90	60-90	50-90	20-55	<26	NP-7
	18-48	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-15	60-90	60-90	50-90	20-80	25-40	8-18
	48-65	Clay loam, clay, shaly clay loam.	CL, CH, SC	A-6, A-7	0-30	55-90	55-90	50-90	45-85	37-60	16-34
Panama----------	0-21	Stony fine sandy loam.	GM, SM, SM-SC	A-1, A-2, A-4	25-60	45-85	45-85	40-85	15-50	<26	NP-7
	21-42	Gravelly sandy clay loam, very gravelly sandy clay loam, gravelly clay loam.	GC, CL, SC	A-2, A-4, A-6, A-1	15-45	35-75	35-75	30-75	13-70	25-40	8-18
	42-65	Clay loam, shaly clay loam, clay.	GC, SC, CL, CH	A-2, A-6, A-7, A-1	0	25-90	25-90	25-85	20-85	37-60	16-34
54--------------- Pocola	0-8	Silt loam--------	CL	A-4, A-6	0	100	100	96-100	65-97	30-37	8-14
	8-13	Clay loam, silty clay loam.	CL	A-6, A-7	0	100	100	96-100	80-98	33-43	12-20
	13-81	Clay, silty clay	CL, CH	A-7	0	100	100	98-100	90-99	41-60	18-34
55. Psamments											

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag-ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
56---------------- Redport	0-30	Silty clay loam	CL	A-6, A-7	0	100	100	96-100	80-98	33-43	12-20
	30-65	Silt loam, clay loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	100	96-100	80-98	30-43	8-20
57---------------- Rexor	0-10	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	98-100	98-100	96-100	65-97	22-37	3-14
	10-65	Clay loam, silt loam, silty clay loam.	CL	A-4, A-6	0	98-100	98-100	96-100	80-98	30-40	8-17
58---------------- Roxana	0-9	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	85-100	50-75	<27	NP-7
	9-62	Silt loam, very fine sandy loam, loamy very fine sand.	ML, CL-ML	A-4	0	100	100	85-100	50-85	<27	NP-7
59, 60----------- Sallisaw	0-7	Loam-------------	CL, ML, SM, SC	A-2, A-4	0	75-100	75-100	70-100	25-97	20-30	NP-10
	7-42	Loam, clay loam, sandy clay loam.	SC, CL	A-2, A-4, A-6	0	50-100	50-100	45-95	17-90	25-40	8-18
	42-62	Very gravelly loam, very gravelly silt loam, very gravelly clay loam.	GC	A-2, A-4, A-6	0-30	20-50	20-50	20-50	13-49	25-40	8-18
61---------------- Sallisaw	0-6	Loam-------------	CL, ML, SM, SC	A-2, A-4	0	75-100	75-100	70-100	25-97	20-30	NP-10
	6-30	Loam, clay loam, sandy clay loam.	SC, CL	A-2, A-4, A-6	0	50-100	50-100	45-95	17-90	25-40	8-18
	30-60	Very gravelly loam, very gravelly silt loam, very gravelly clay loam.	GC	A-2, A-4, A-6	0-30	20-50	20-50	20-50	13-49	25-40	8-18
62---------------- Sallisaw	0-7	Stony loam-------	CL, ML, CL-ML	A-2, A-4	10-25	70-85	70-85	60-85	25-80	20-30	NP-10
	7-42	Loam, clay loam, sandy clay loam.	SC, CL	A-2, A-4, A-6	0	50-100	50-100	45-95	17-90	25-40	8-18
	42-62	Very gravelly loam, very gravelly silt loam, very gravelly clay loam.	GC	A-2, A-4, A-6	0-30	20-50	20-50	20-50	13-49	25-40	8-18
63---------------- Severn	0-9	Very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	0	100	100	94-100	65-97	22-31	3-12
	9-84	Stratified silt loam to loamy very fine sand.	ML, CL-ML	A-4	0	100	100	94-100	65-97	<28	NP-7
64:* Sherless---------	0-11	Fine sandy loam	SM, SC, CL, ML	A-2, A-4	0-20	70-90	70-90	45-80	25-55	<26	NP-8
	11-32	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-10	70-90	70-90	45-85	25-80	25-40	7-18
	32-40	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
64:*											
Bengal----------	0-7	Fine sandy loam	CL, CL-ML	A-4	10-55	85-90	85-90	70-85	55-75	24-30	4-10
	7-30	Clay, silty clay	CL, CH	A-7	0	85-100	85-100	75-100	75-99	41-60	18-34
	30-36	Clay, silty clay, shaly clay.	CL, CH	A-7	0	55-100	55-100	55-100	50-99	41-60	18-34
	36-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
65, 66----------- Shermore	0-8	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4, A-2	0	75-98	75-98	60-85	25-60	<26	NP-7
	8-27	Sandy clay loam, clay loam, loam.	CL, SC	A-4, A-6, A-2	0	75-98	75-98	60-90	25-90	25-40	8-18
	27-70	Sandy clay loam, clay loam, loam.	CL, SC	A-4, A-6, A-2	0	85-98	85-98	70-90	30-90	25-40	8-18
67--------------- Shermore	0-7	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4, A-2	0	75-98	75-98	60-85	25-60	<26	NP-7
	7-31	Sandy clay loam, clay loam, loam.	CL, SC	A-4, A-6, A-2	0	75-98	75-98	60-90	25-90	25-40	8-18
	31-80	Sandy clay loam, clay loam, loam.	CL, SC	A-4, A-6, A-2	0	85-98	85-98	70-90	30-90	25-40	8-18
68--------------- Shermore	0-4	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4, A-2	0	75-98	75-98	60-85	25-60	<26	NP-7
	4-17	Sandy clay loam, clay loam, loam.	CL, SC	A-4, A-6, A-2	0	75-98	75-98	60-90	25-90	25-40	8-18
	17-65	Sandy clay loam, clay loam, loam.	CL, SC	A-4, A-6, A-2	0	85-98	85-98	70-90	30-90	25-40	8-18
69--------------- Speer	0-7	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	100	98-100	94-100	36-60	<26	NP-7
	7-11	Loam, fine sandy loam, sandy clay loam.	CL, ML, SC, SM	A-4, A-6	0	100	98-100	90-100	36-85	22-40	2-18
	11-46	Clay loam, sandy clay loam, loam.	CL, SC	A-4, A-6	0	100	100	90-100	36-90	25-40	7-18
	46-63	Loam, fine sandy loam.	ML, SM, CL-ML, SM-SC	A-4	0	100	80-100	80-100	36-85	<29	NP-7
70:*											
Speer-----------	0-7	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	100	98-100	94-100	36-60	<26	NP-7
	7-11	Loam, fine sandy loam, sandy clay loam.	CL, ML, SC, SM	A-4, A-6	0	100	98-100	90-100	36-85	22-40	2-18
	11-46	Clay loam, sandy clay loam, loam.	CL, SC	A-4, A-6	0	100	100	90-100	36-90	25-40	7-18
	46-63	Loam, fine sandy loam.	ML, SM, CL-ML, SM-SC	A-4	0	100	80-100	80-100	36-85	<29	NP-7
Neff------------	0-23	Silt loam--------	CL	A-4, A-6	0	100	100	96-100	65-97	30-37	8-14
	23-57	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	96-100	80-98	30-42	11-19
	57-82	Silt loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	100	96-100	80-98	30-42	8-19
71, 72----------- Stigler	0-22	Silt loam--------	CL, ML, CL-ML	A-4, A-6	0	100	100	94-100	60-97	20-37	2-14
	22-40	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	100	100	96-100	80-99	37-70	15-38
	40-71	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	---	100	100	96-100	80-99	37-70	15-38

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
73, 74----------- Stigler	0-18	Silt loam--------	CL, ML, CL-ML	A-4, A-6	0	100	100	94-100	60-97	20-37	2-14
	18-41	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	100	100	96-100	80-99	37-70	15-38
	41-74	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	---	100	100	96-100	80-99	37-70	15-38
	74-99	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	---	100	100	96-100	80-99	37-70	15-38
75--------------- Tuskahoma	0-5	Loam-------------	ML, CL, CL-ML	A-4	0	80-100	80-100	75-100	55-97	22-31	2-10
	5-10	Clay, silty clay, silty clay loam.	CH, CL	A-7, A-6	0	55-100	55-100	50-100	50-99	37-60	15-34
	10-15	Shaly silty clay, shaly clay, shaly silty clay loam.	CH, CL, GC	A-7, A-6, A-2	0	35-70	35-70	35-70	30-70	37-60	15-34
	15-30	Weathered bedrock	---	---	---	---	---	---	---	---	---
76--------------- Tuskahoma	0-5	Stony loam-------	CL, ML, CL-ML	A-4	0-30	85-100	85-100	75-100	55-97	22-31	2-10
	5-10	Clay, silty clay, silty clay loam.	CL, CH	A-6, A-7	0	55-100	55-100	50-100	50-99	37-60	15-34
	10-15	Shaly clay, shaly silty clay, shaly silty clay loam.	GC, CL, CH	A-2, A-6, A-7	0	35-70	35-70	35-70	30-70	37-60	15-34
	15-30	Weathered bedrock	---	---	---	---	---	---	---	---	---
77, 78----------- Vian	0-18	Silt loam--------	CL	A-4, A-6	0	100	100	96-100	65-97	30-37	8-14
	18-23	Silt loam, loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	100	96-100	65-98	30-43	9-20
	23-65	Silty clay loam, clay loam.	CL	A-6, A-7	0	85-100	85-98	80-90	70-80	33-43	12-20
79--------------- Wabbaseka	0-18	Silty clay-------	CH, CL	A-7	0	100	100	95-100	85-95	44-75	22-45
	18-61	Loam, silt loam, fine sandy loam.	CL-ML, CL, SC	A-2, A-4, A-6	0	100	95-100	85-95	30-90	<30	NP-11
80, 81----------- Wetsaw	0-10	Fine sandy loam	SM, SC, CL, ML	A-2, A-4	0-10	75-100	74-100	71-100	30-85	<31	NP-10
	10-33	Loam, clay loam, sandy clay loam.	CL, SC	A-2, A-4, A-6	0-10	75-100	75-100	67-100	30-90	26-40	7-18
	33-48	Gravelly clay loam, gravelly sandy clay loam, very gravelly clay.	GC, GP-GC, SC	A-2, A-4, A-6, A-7	0-30	20-70	20-70	15-70	5-65	26-55	7-25
	48-65	Clay, silty clay	CL, CH	A-7	0-10	75-100	75-100	71-100	67-99	41-60	18-34
82--------------- Wing	0-6	Silt loam--------	CL, ML, CL-ML	A-4, A-6	0	100	100	90-100	85-95	20-35	3-15
	6-70	Silty clay, silty clay loam, clay loam.	CH, CL	A-7	0	100	100	95-100	90-100	45-70	20-45
83, 84, 85------- Wister	0-15	Silt loam--------	ML, CL, CL-ML	A-4	0	90-100	90-100	86-100	70-97	22-30	2-10
	15-53	Silty clay, clay, silty clay loam.	CL, CH	A-7	0	90-100	90-100	85-100	85-99	41-65	18-35
	53-64	Weathered bedrock	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
1----------------- Bengal	0-7	10-20	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low--------	0.24	3	.5-2
	7-30	40-60	1.35-1.60	0.06-0.2	0.10-0.18	4.5-5.5	High-------	0.32		
	30-36	40-60	1.35-1.60	0.06-0.2	0.06-0.18	4.5-5.5	High-------	0.32		
	36-50	---	---	---	---	---	-----------	----		
2:*										
Bengal----------	0-7	10-20	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low--------	0.24	3	.5-2
	7-30	40-60	1.35-1.60	0.06-0.2	0.10-0.18	4.5-5.5	High-------	0.32		
	30-36	40-60	1.35-1.60	0.06-0.2	0.06-0.18	4.5-5.5	High-------	0.32		
	36-50	---	---	---	---	---	-----------	----		
Clebit----------	0-4	10-20	1.30-1.60	2.0-6.0	0.04-0.08	4.5-6.5	Low--------	0.17	1	.5-1
	4-15	10-20	1.30-1.60	2.0-6.0	0.04-0.10	4.5-6.5	Low--------	0.28		
	15-30	---	---	---	---	---	-----------	----		
3:*										
Bengal----------	0-7	10-20	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low--------	0.24	3	.5-2
	7-30	40-60	1.35-1.60	0.06-0.2	0.10-0.18	4.5-5.5	High-------	0.32		
	30-36	40-60	1.35-1.60	0.06-0.2	0.06-0.18	4.5-5.5	High-------	0.32		
	36-50	---	---	---	---	---	-----------	----		
Octavia---------	0-18	15-20	1.30-1.60	0.6-2.0	0.07-0.14	4.5-6.0	Low--------	0.20	5	.5-1
	18-48	20-35	1.45-1.70	0.6-2.0	0.08-0.19	4.5-5.5	Low--------	0.28		
	48-65	35-60	1.35-1.65	0.2-0.6	0.08-0.19	4.5-5.5	Moderate	0.28		
4:*										
Bengal----------	0-7	10-20	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low--------	0.24	3	.5-2
	7-30	40-60	1.35-1.60	0.06-0.2	0.10-0.18	4.5-5.5	High-------	0.32		
	30-36	40-60	1.35-1.60	0.06-0.2	0.06-0.18	4.5-5.5	High-------	0.32		
	36-50	---	---	---	---	---	-----------	----		
Octavia---------	0-18	15-20	1.30-1.60	0.6-2.0	0.07-0.14	4.5-6.0	Low--------	0.20	5	.5-1
	18-48	20-35	1.45-1.70	0.6-2.0	0.08-0.19	4.5-5.5	Low--------	0.28		
	48-65	35-60	1.35-1.65	0.2-0.6	0.08-0.19	4.5-5.5	Moderate	0.28		
Tuskahoma-------	0-5	10-18	1.30-1.55	0.2-2.0	0.15-0.24	5.6-7.8	Low--------	0.32	1	.5-2
	5-10	35-60	1.35-1.60	<0.06	0.08-0.20	5.1-7.8	High-------	0.32		
	10-15	35-60	1.35-1.60	<0.06	0.05-0.15	5.6-7.8	High-------	0.32		
	15-30	---	---	---	---	---	-----------	----		
5:*										
Bengal----------	0-7	10-20	1.30-1.60	0.6-2.0	0.11-0.15	4.5-6.0	Low--------	0.32	3	.5-2
	7-30	40-60	1.35-1.60	0.06-0.2	0.10-0.18	4.5-5.5	High-------	0.32		
	30-36	40-60	1.35-1.60	0.06-0.2	0.06-0.18	4.5-5.5	High-------	0.32		
	36-50	---	---	---	---	---	-----------	----		
Pirum-----------	0-6	18-27	1.30-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low--------	0.24	3	.5-2
	6-30	18-35	1.25-1.60	0.6-2.0	0.14-0.18	4.5-5.5	Low--------	0.32		
	30-40	---	---	---	---	---	-----------	----		
Clebit----------	0-4	10-20	1.30-1.60	2.0-6.0	0.05-0.10	4.5-6.5	Low--------	0.28	1	.5-1
	4-15	10-20	1.30-1.60	2.0-6.0	0.04-0.10	4.5-6.5	Low--------	0.28		
	15-30	---	---	---	---	---	-----------	----		
6, 7------------- Carnasaw	0-8	15-26	1.30-1.60	0.6-2.0	0.10-0.20	4.5-6.0	Low--------	0.24	4	.5-2
	8-12	35-45	1.45-1.70	0.2-0.6	0.12-0.20	4.5-5.5	High-------	0.37		
	12-43	40-60	1.35-1.60	0.06-0.2	0.12-0.18	4.5-5.5	High-------	0.32		
	43-51	40-60	1.35-1.60	0.06-0.2	0.07-0.15	4.5-5.5	High-------	0.32		
	51-60	---	---	---	---	---	-----------	----		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
8:*										
Carnasaw---------	0-8	15-26	1.30-1.60	0.6-2.0	0.10-0.20	4.5-6.0	Low--------	0.24	4	.5-2
	8-12	35-45	1.45-1.70	0.2-0.6	0.12-0.20	4.5-5.5	High-------	0.37		
	12-43	40-60	1.35-1.60	0.06-0.2	0.12-0.18	4.5-5.5	High-------	0.32		
	43-51	40-60	1.35-1.60	0.06-0.2	0.07-0.15	4.5-5.5	High-------	0.32		
	51-60	---	---	---	---	---	-----------	----		
Clebit-----------	0-4	10-20	1.30-1.60	2.0-6.0	0.04-0.08	4.5-6.5	Low--------	0.17	1	.5-1
	4-15	10-20	1.30-1.60	2.0-6.0	0.04-0.10	4.5-6.5	Low--------	0.28		
	15-30	---	---	---	---	---	-----------	----		
9,* 10:*										
Carnasaw---------	0-8	15-26	1.30-1.60	0.6-2.0	0.10-0.20	4.5-6.0	Low--------	0.24	4	.5-2
	8-12	35-45	1.45-1.70	0.2-0.6	0.12-0.20	4.5-5.5	High-------	0.37		
	12-43	40-60	1.35-1.60	0.06-0.2	0.12-0.18	4.5-5.5	High-------	0.32		
	43-51	40-60	1.35-1.60	0.06-0.2	0.07-0.15	4.5-5.5	High-------	0.32		
	51-60	---	---	---	---	---	-----------	----		
Octavia----------	0-18	15-20	1.30-1.55	0.6-2.0	0.10-0.19	4.5-6.0	Low--------	0.32	5	.5-1
	18-48	20-35	1.45-1.70	0.6-2.0	0.08-0.19	4.5-5.5	Low--------	0.28		
	48-65	35-60	1.35-1.65	0.2-0.6	0.08-0.19	4.5-5.5	Moderate	0.28		
11,* 12:*										
Carnasaw---------	0-8	15-26	1.30-1.60	0.6-2.0	0.10-0.20	4.5-6.0	Low--------	0.24	4	.5-2
	8-12	35-45	1.45-1.70	0.2-0.6	0.12-0.20	4.5-5.5	High-------	0.37		
	12-43	40-60	1.35-1.60	0.06-0.2	0.12-0.18	4.5-5.5	High-------	0.32		
	43-51	40-60	1.35-1.60	0.06-0.2	0.07-0.15	4.5-5.5	High-------	0.32		
	51-60	---	---	---	---	---	-----------	----		
Pirum------------	0-6	18-27	1.30-1.60	0.6-2.0	0.08-0.12	4.5-5.5	Low--------	0.20	3	.5-2
	6-30	18-35	1.25-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low--------	0.32		
	30-40	---	---	---	---	---	-----------	----		
13:*										
Ceda-------------	0-8	10-18	1.30-1.55	6.0-20	0.07-0.17	5.6-6.5	Low--------	0.28	5	.5-1
	8-65	15-32	1.40-1.70	6.0-20	0.02-0.16	5.6-6.5	Low--------	0.28		
Rubble land.										
14, 15-----------	0-4	10-20	1.30-1.60	2.0-6.0	0.04-0.08	4.5-6.5	Low--------	0.17	1	.5-1
Clebit	4-15	10-20	1.30-1.60	2.0-6.0	0.04-0.10	4.5-6.5	Low--------	0.28		
	15-30	---	---	---	---	---	-----------	----		
16:*										
Clebit-----------	0-4	10-20	1.30-1.60	2.0-6.0	0.04-0.08	4.5-6.5	Low--------	0.17	1	.5-1
	4-15	10-20	1.30-1.60	2.0-6.0	0.04-0.10	4.5-6.5	Low--------	0.28		
	15-30	---	---	---	---	---	-----------	----		
Carnasaw---------	0-8	15-26	1.30-1.60	0.6-2.0	0.10-0.20	4.5-6.0	Low--------	0.24	4	.5-2
	8-12	35-45	1.45-1.70	0.2-0.6	0.12-0.20	4.5-5.5	High-------	0.37		
	12-43	40-60	1.35-1.60	0.06-0.2	0.12-0.18	4.5-5.5	High-------	0.32		
	43-51	40-60	1.35-1.60	0.06-0.2	0.07-0.15	4.5-5.5	High-------	0.32		
	51-60	---	---	---	---	---	-----------	----		
Pirum------------	0-6	18-27	1.30-1.60	0.6-2.0	0.08-0.12	4.5-5.5	Low--------	0.20	3	.5-2
	6-30	18-35	1.25-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low--------	0.32		
	30-40	---	---	---	---	---	-----------	----		
17, 18-----------	0-15	10-26	1.30-1.70	0.6-2.0	0.18-0.23	5.6-7.3	Low--------	0.37	5	.5-4
Coushatta	15-35	18-30	1.30-1.65	0.6-2.0	0.18-0.23	6.1-8.4	Moderate	0.32		
	35-63	10-30	1.30-1.65	0.6-2.0	0.14-0.23	6.6-8.4	Low--------	0.37		
19---------------	0-15	27-38	1.30-1.70	0.6-2.0	0.18-0.21	5.6-7.3	Moderate	0.32	5	.5-4
Coushatta	15-35	18-30	1.30-1.65	0.6-2.0	0.18-0.23	6.1-8.4	Moderate	0.32		
	35-63	10-30	1.30-1.65	0.6-2.0	0.14-0.23	6.6-8.4	Low--------	0.37		
20---------------	0-16	2-8	1.35-1.50	2.0-6.0	0.02-0.06	6.1-7.3	Low--------	0.20	5	.5-1
Coushatta	16-36	18-35	1.40-1.70	0.6-2.0	0.18-0.23	6.1-8.4	Moderate	0.32		
	36-60	10-35	1.35-1.65	0.6-2.0	0.14-0.23	6.6-8.4	Moderate	0.37		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Shrink- swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
21, 22	0-8	15-25	1.30-1.55	0.6-2.0	0.08-0.24	5.1-7.3	Low	0.43	3	.5-2
Cowton	8-14	27-40	1.45-1.75	0.2-0.6	0.08-0.22	4.5-6.0	Moderate	0.37		
	14-34	35-60	1.35-1.65	0.06-0.2	0.10-0.22	4.5-5.5	High	0.37		
	34-40	---	---	---	---	---	-----------	----		
23	0-12	5-12	1.45-1.55	6.0-20	0.08-0.08	5.6-8.4	Low	0.15	5	.5-2
Crevasse	12-65	2-8	1.40-1.50	6.0-20	0.02-0.06	5.6-8.4	Low	0.15		
24	0-21	15-26	1.30-1.50	0.6-2.0	0.16-0.24	4.5-6.5	Low	0.37	5	.5-2
Cupco	21-55	27-35	1.45-1.75	0.2-0.6	0.18-0.22	4.5-6.5	Moderate	0.32		
	55-83	27-35	1.45-1.75	0.2-0.6	0.15-0.22	5.1-7.3	Moderate	0.32		
25	0-6	27-35	1.30-1.60	0.2-0.6	0.18-0.22	6.1-7.3	Moderate	0.37	5	1-4
Garton	6-51	35-45	1.35-1.65	0.06-0.2	0.12-0.22	6.1-7.8	High	0.37		
	51-63	20-35	1.40-1.65	0.2-0.6	0.15-0.20	6.6-7.8	Moderate	0.32		
26	0-15	5-10	1.35-1.50	2.0-6.0	0.07-0.11	5.6-7.3	Low	0.20	5	.5-1
Kamie	15-43	20-35	1.35-1.65	0.6-2.0	0.12-0.20	4.5-6.0	Low	0.32		
	43-64	18-32	1.35-1.65	0.6-2.0	0.11-0.17	4.5-6.0	Low	0.32		
27	0-7	5-10	1.35-1.50	2.0-6.0	0.07-0.11	5.6-7.3	Low	0.20	5	.5-1
Kamie	7-50	20-35	1.35-1.65	0.6-2.0	0.12-0.20	4.5-6.0	Low	0.32		
	50-75	18-32	1.35-1.65	0.6-2.0	0.11-0.17	4.5-6.0	Low	0.32		
28	0-6	27-35	1.30-1.60	0.6-2.0	0.08-0.17	5.6-8.4	Low	0.28	4	.5-2
Kanima	6-75	18-35	1.40-1.70	0.6-2.0	0.02-0.12	5.6-8.4	Low	0.28		
29:*										
Kenn	0-7	10-25	1.30-1.55	0.6-2.0	0.10-0.18	5.1-6.5	Low	0.37	5	.5-2
	7-29	20-30	1.45-1.70	0.6-2.0	0.06-0.18	4.5-5.5	Moderate	0.28		
	29-45	20-30	1.45-1.70	0.6-2.0	0.02-0.10	4.5-5.5	Moderate	0.28		
	45-70	10-25	1.40-1.70	0.6-2.0	0.02-0.05	4.5-5.5	Low	0.32		
Ceda	0-8	10-18	1.30-1.55	6.0-20	0.07-0.17	5.6-6.5	Low	0.28	5	.5-1
	8-65	15-32	1.40-1.70	6.0-20	0.02-0.16	5.6-6.5	Low	0.28		
30	0-9	5-15	1.30-1.60	0.6-2.0	0.10-0.15	6.1-8.4	Low	0.17	5	<1
Kiomatia	9-60	2-15	1.40-1.65	6.0-20	0.05-0.10	6.1-8.4	Low	0.17		
31	0-11	28-40	1.30-1.60	0.2-0.6	0.15-0.20	6.1-8.4	Moderate	0.28	5	<1
Kiomatia	11-65	2-15	1.40-1.65	6.0-20	0.05-0.10	6.1-8.4	Low	0.17		
32	0-7	40-55	1.20-1.70	<0.06	0.18-0.20	6.6-8.4	Very high	0.32	5	.5-4
Latanier	7-31	40-55	1.20-1.70	<0.06	0.18-0.20	6.6-8.4	Very high	0.32		
	31-86	10-27	1.30-1.65	0.06-2.0	0.18-0.22	6.6-8.4	Low	0.37		
33	0-10	8-17	1.30-1.60	2.0-6.0	0.13-0.20	7.4-8.4	Low	0.43	5	.5-2
Lela	10-70	40-55	1.35-1.60	<0.06	0.12-0.18	6.6-8.4	High	0.37		
34, 35	0-20	40-55	1.25-1.45	<0.06	0.12-0.18	6.1-7.8	High	0.37	5	.1-3
Lela	20-70	40-55	1.35-1.60	<0.06	0.12-0.18	7.4-8.4	High	0.37		
36	0-10	35-55	1.35-1.60	<0.06	0.12-0.18	7.4-8.4	High	0.32	5	1-2
Lynnville Variant	10-75	25-35	1.30-1.65	0.2-0.6	0.14-0.23	7.4-8.4	Moderate	0.37		
37	0-5	12-27	1.32-1.65	0.6-2.0	0.14-0.22	5.1-6.5	Low	0.43	5	.5-2
McKamie	5-44	35-60	1.20-1.45	<0.06	0.18-0.20	4.5-6.0	High	0.32		
	44-63	14-35	1.40-1.76	0.2-2.0	0.14-0.22	4.5-8.4	Moderate	0.37		
38	0-3	12-27	1.32-1.65	0.6-2.0	0.14-0.22	5.1-6.5	Low	0.43	5	.5-2
McKamie	3-36	35-60	1.20-1.45	<0.06	0.18-0.20	4.5-6.0	High	0.32		
	36-65	14-35	1.40-1.76	0.2-2.0	0.14-0.22	4.5-8.4	Moderate	0.37		
39	0-15	39-50	1.20-1.50	<0.06	0.18-0.20	6.1-7.8	Very high	0.32	5	2-4
Moreland	15-42	39-60	1.20-1.45	<0.06	0.18-0.20	6.6-8.4	High	0.32		
	42-63	35-60	1.20-1.75	<0.2	0.18-0.21	7.4-8.4	Very high	0.32		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Shrink- swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
40, 41----------- Moreland	0-15	27-39	1.45-1.75	0.06-0.2	0.19-0.21	6.1-7.8	Moderate	0.37	5	2-4
	15-42	39-60	1.20-1.45	<0.06	0.18-0.20	6.6-8.4	High------	0.32		
	42-63	35-60	1.20-1.75	<0.2	0.18-0.21	7.4-8.4	Very high	0.32		
42--------------- Neff	0-23	15-26	1.30-1.55	0.6-2.0	0.15-0.24	4.5-6.0	Low--------	0.43	5	.5-3
	23-57	25-35	1.40-1.70	0.2-0.6	0.16-0.24	4.5-6.5	Moderate	0.32		
	57-82	18-35	1.40-1.70	0.2-0.6	0.16-0.24	4.5-6.5	Moderate	0.32		
43:*										
Neff------------	0-23	15-26	1.30-1.55	0.6-2.0	0.15-0.24	4.5-6.0	Low--------	0.43	5	.5-3
	23-57	25-35	1.40-1.70	0.2-0.6	0.16-0.24	4.5-6.5	Moderate	0.32		
	57-82	18-35	1.40-1.70	0.2-0.6	0.16-0.24	4.5-6.5	Moderate	0.32		
Rexor------------	0-10	15-26	1.30-1.55	0.6-2.0	0.15-0.24	4.5-6.0	Low--------	0.37	5	1-3
	10-65	18-35	1.35-1.65	0.6-2.0	0.15-0.24	4.5-6.0	Moderate	0.37		
44, 45----------- Norwood	0-9	27-40	1.30-1.70	0.6-2.0	0.18-0.22	7.4-8.4	Moderate	0.32	5	.5-2
	9-25	18-35	1.30-1.65	0.6-2.0	0.15-0.22	7.9-8.4	Low--------	0.43		
	25-68	10-35	1.30-1.65	0.6-2.0	0.15-0.22	7.9-8.4	Low--------	0.43		
46--------------- Norwood	0-9	10-27	1.30-1.55	0.6-2.0	0.17-0.21	7.4-8.4	Low--------	0.43	5	.5-2
	9-25	18-35	1.30-1.65	0.6-2.0	0.15-0.22	7.9-8.4	Low--------	0.43		
	25-68	10-35	1.30-1.65	0.6-2.0	0.15-0.22	7.9-8.4	Low--------	0.43		
47--------------- Octavia	0-18	15-20	1.30-1.55	0.6-2.0	0.10-0.19	4.5-6.0	Low--------	0.32	5	.5-1
	18-48	20-35	1.45-1.70	0.6-2.0	0.08-0.19	4.5-5.5	Low--------	0.28		
	48-65	35-60	1.35-1.65	0.2-0.6	0.08-0.19	4.5-5.5	Moderate	0.28		
48:*										
Octavia---------	0-18	15-20	1.30-1.55	0.6-2.0	0.10-0.19	4.5-6.0	Low--------	0.32	5	.5-1
	18-48	20-35	1.45-1.70	0.6-2.0	0.08-0.19	4.5-5.5	Low--------	0.28		
	48-65	35-60	1.35-1.65	0.2-0.6	0.08-0.19	4.5-5.5	Moderate	0.28		
Carnasaw--------	0-8	15-26	1.30-1.60	0.6-2.0	0.10-0.20	4.5-6.0	Low--------	0.24	4	.5-2
	8-12	35-45	1.45-1.70	0.2-0.6	0.12-0.20	4.5-5.5	High-------	0.37		
	12-43	40-60	1.35-1.60	0.06-0.2	0.12-0.18	4.5-5.5	High-------	0.32		
	43-51	40-60	1.35-1.60	0.06-0.2	0.07-0.15	4.5-5.5	High-------	0.32		
	51-60	---	---	---	---	---	----------	----		
49--------------- Oklared	0-6	10-18	1.30-1.60	2.0-6.0	0.11-0.15	7.4-8.4	Low--------	0.20	5	.5-1
	6-32	10-44	1.45-1.70	2.0-6.0	0.12-0.16	7.4-8.4	Low--------	0.32		
	32-63	44-60	1.50-1.70	2.0-6.0	0.10-0.16	7.4-8.4	Low--------	0.32		
50:*										
Pirum-----------	0-6	18-27	1.30-1.60	0.6-2.0	0.08-0.12	4.5-5.5	Low--------	0.20	3	.5-2
	6-30	18-35	1.25-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low--------	0.32		
	30-40	---	---	---	---	---	----------	----		
Carnasaw--------	0-8	15-26	1.30-1.60	0.6-2.0	0.10-0.20	4.5-6.0	Low--------	0.24	4	.5-2
	8-12	35-45	1.45-1.70	0.2-0.6	0.12-0.20	4.5-5.5	High-------	0.37		
	12-43	40-60	1.35-1.60	0.06-0.2	0.12-0.18	4.5-5.5	High-------	0.32		
	43-51	40-60	1.35-1.60	0.06-0.2	0.07-0.15	4.5-5.5	High-------	0.32		
	51-60	---	---	---	---	---	----------	----		
Caston----------	0-10	15-20	1.30-1.60	2.0-6.0	0.05-0.12	5.1-7.3	Low--------	0.15	5	.5-1
	10-22	15-20	1.40-1.70	0.6-2.0	0.02-0.12	4.5-5.5	Low--------	0.15		
	22-80	20-35	1.45-1.70	0.6-2.0	0.02-0.10	4.5-5.5	Low--------	0.24		
51:*										
Pirum-----------	0-6	18-27	1.30-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low--------	0.24	3	.5-2
	6-30	18-35	1.25-1.60	0.6-2.0	0.14-0.18	4.5-5.5	Low--------	0.32		
	30-40	---	---	---	---	---	----------	----		
Clebit----------	0-4	10-20	1.30-1.60	2.0-6.0	0.05-0.10	4.5-6.5	Low--------	0.28	1	.5-1
	4-15	10-20	1.30-1.60	2.0-6.0	0.04-0.10	4.5-6.5	Low--------	0.28		
	15-30	---	---	---	---	---	----------	----		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
52:*										
Pirum	0-4	18-27	1.30-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.24	3	.5-2
	4-30	18-35	1.25-1.60	0.6-2.0	0.14-0.18	4.5-5.5	Low	0.32		
	30-40	---	---	---	---	---	-----------	----		
Clebit	0-4	10-20	1.30-1.60	2.0-6.0	0.05-0.10	4.5-6.5	Low	0.28	1	.5-1
	4-10	10-20	1.30-1.60	2.0-6.0	0.04-0.10	4.5-6.5	Low	0.28		
	10-13	---	---	---	---	---	-----------	----		
53*:										
Pirum	0-6	18-27	1.30-1.60	0.6-2.0	0.08-0.12	4.5-5.5	Low	0.20	3	.5-2
	6-30	18-35	1.25-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.32		
	30-40	---	---	---	---	---	-----------	----		
Octavia	0-18	15-20	1.30-1.60	0.6-2.0	0.07-0.14	4.5-6.0	Low	0.20	5	.5-1
	18-48	20-35	1.45-1.70	0.6-2.0	0.08-0.19	4.5-5.5	Low	0.28		
	48-65	35-60	1.35-1.65	0.2-0.6	0.08-0.19	4.5-5.5	Moderate	0.28		
Panama	0-21	15-20	1.30-1.60	0.6-2.0	0.05-0.14	4.5-6.0	Low	0.20	5	.5-3
	21-42	20-35	1.45-1.70	0.6-2.0	0.04-0.12	4.5-5.5	Low	0.28		
	42-65	35-60	1.35-1.65	0.2-0.6	0.03-0.18	4.5-5.5	Moderate	0.24		
54 Pocola	0-8	18-26	1.30-1.55	0.6-2.0	0.15-0.24	5.1-6.5	Low	0.49	5	.5-2
	8-13	27-35	1.45-1.70	0.2-0.6	0.15-0.22	5.1-6.5	Moderate	0.43		
	13-81	40-60	1.35-1.60	<0.06	0.12-0.18	5.1-8.4	High	0.43		
	57-81	40-60	1.35-1.60	<0.06	0.12-0.18	7.9-8.4	High	0.43		
55. Psamments										
56 Redport	0-30	27-35	1.30-1.60	0.6-2.0	0.15-0.22	7.4-8.4	Moderate	0.32	5	1-3
	30-65	18-35	1.40-1.70	0.6-2.0	0.15-0.24	7.4-8.4	Moderate	0.37		
57 Rexor	0-10	15-26	1.30-1.55	0.6-2.0	0.15-0.24	4.5-6.0	Low	0.37	5	1-3
	10-65	18-35	1.35-1.65	0.6-2.0	0.15-0.24	4.5-6.0	Moderate	0.37		
58 Roxana	0-9	5-27	1.35-1.80	0.6-2.0	0.10-0.21	6.1-8.4	Low	0.43	5	.5-2
	9-62	10-18	1.35-1.80	0.6-2.0	0.10-0.19	6.6-8.4	Low	0.37		
59, 60 Sallisaw	0-7	12-20	1.30-1.60	0.6-2.0	0.10-0.20	5.6-7.3	Low	0.37	4	.5-2
	7-42	15-35	1.40-1.70	0.6-2.0	0.11-0.18	4.5-6.0	Low	0.32		
	42-62	22-35	1.40-1.70	0.6-2.0	0.06-0.10	4.5-6.0	Low	0.28		
61 Sallisaw	0-6	12-20	1.30-1.60	0.6-2.0	0.10-0.20	5.6-7.3	Low	0.37	4	.5-2
	6-30	15-35	1.40-1.70	0.6-2.0	0.11-0.18	4.5-6.0	Low	0.32		
	30-60	22-35	1.40-1.70	0.6-2.0	0.06-0.10	4.5-6.0	Low	0.28		
62 Sallisaw	0-7	12-20	1.30-1.60	0.6-2.0	0.05-0.18	5.6-7.3	Low	0.28	4	.5-2
	7-42	15-35	1.40-1.70	0.6-2.0	0.11-0.18	4.5-6.0	Low	0.32		
	42-62	22-35	1.40-1.70	0.6-2.0	0.06-0.10	4.5-6.0	Low	0.28		
63 Severn	0-9	8-17	1.30-1.50	2.0-6.0	0.13-0.20	7.4-8.4	Low	0.37	5	.5-1
	9-84	8-17	1.35-1.60	2.0-6.0	0.11-0.20	7.9-8.4	Low	0.32		
64:*										
Sherless	0-11	5-18	1.30-1.60	2.0-6.0	0.07-0.11	4.5-7.3	Low	0.24	3	<1
	11-32	20-35	1.45-1.70	0.6-2.0	0.09-0.18	4.5-5.5	Low	0.28		
	32-40	---	---	---	---	---	-----------	----		
Bengal	0-7	10-20	1.30-1.60	0.6-2.0	0.13-0.20	4.5-6.0	Low	0.20	3	.5-2
	7-30	40-60	1.35-1.60	0.06-0.2	0.10-0.18	4.5-5.5	High	0.32		
	30-36	40-60	1.35-1.60	0.06-0.2	0.06-0.18	4.5-5.5	High	0.32		
	36-50	---	---	---	---	---	-----------	----		
65, 66 Shermore	0-8	10-15	1.30-1.60	2.0-6.0	0.08-0.15	5.1-6.5	Low	0.24	5	.5-2
	8-27	18-35	1.45-1.70	0.6-2.0	0.07-0.15	4.5-6.0	Low	0.37		
	27-70	18-38	1.55-1.75	0.2-0.6	0.05-0.10	4.5-6.0	Low	0.32		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Shrink- swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
67 Shermore	0-7	10-15	1.30-1.60	2.0-6.0	0.08-0.15	5.1-6.5	Low	0.24	5	.5-2
	7-31	18-35	1.45-1.70	0.6-2.0	0.07-0.15	4.5-6.0	Low	0.37		
	31-80	18-38	1.55-1.75	0.2-0.6	0.05-0.10	4.5-6.0	Low	0.32		
68 Shermore	0-4	10-15	1.30-1.60	2.0-6.0	0.08-0.15	5.1-6.5	Low	0.24	5	.5-2
	4-17	18-35	1.45-1.70	0.6-2.0	0.07-0.15	4.5-6.0	Low	0.37		
	17-65	18-38	1.55-1.75	0.2-0.6	0.05-0.10	4.5-6.0	Low	0.32		
69 Speer	0-7	12-18	1.30-1.60	0.6-2.0	0.11-0.15	5.1-7.3	Low	0.24	5	<1
	7-11	15-22	1.30-1.60	0.6-2.0	0.11-0.20	4.5-6.0	Low	0.32		
	11-46	20-30	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.0	Low	0.28		
	46-63	12-18	1.30-1.60	0.6-2.0	0.11-0.20	4.5-6.5	Low	0.28		
70:*										
Speer	0-7	12-18	1.30-1.60	0.6-2.0	0.11-0.15	5.1-7.3	Low	0.24	5	<1
	7-11	15-22	1.30-1.60	0.6-2.0	0.11-0.20	4.5-6.0	Low	0.32		
	11-46	20-30	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.0	Low	0.28		
	46-63	12-18	1.30-1.60	0.6-2.0	0.11-0.20	4.5-6.5	Low	0.28		
Neff	0-23	15-26	1.30-1.55	0.6-2.0	0.15-0.24	4.5-6.0	Low	0.43	5	.5-3
	23-57	25-35	1.40-1.70	0.2-0.6	0.16-0.24	4.5-6.5	Moderate	0.32		
	57-82	18-35	1.40-1.70	0.2-0.6	0.16-0.24	4.5-6.5	Moderate	0.32		
71, 72 Stigler	0-22	10-20	1.30-1.55	0.6-2.0	0.13-0.24	4.5-5.5	Low	0.49	5	1-3
	22-40	35-60	1.35-1.65	<0.06	0.12-0.22	4.5-6.0	High	0.43		
	40-71	35-60	1.35-1.65	<0.06	0.08-0.20	5.1-7.8	High	0.49		
73, 74 Stigler	0-18	10-20	1.30-1.55	0.6-2.0	0.13-0.24	4.5-5.5	Low	0.49	5	1-3
	18-41	35-60	1.35-1.65	<0.06	0.12-0.22	4.5-6.0	High	0.43		
	41-74	35-60	1.35-1.65	<0.06	0.12-0.22	5.1-7.8	High	0.43		
	74-99	35-60	1.35-1.65	<0.06	0.08-0.20	5.1-7.8	High	0.49		
75 Tuskahoma	0-5	10-18	1.30-1.55	0.2-2.0	0.15-0.24	5.6-7.8	Low	0.49	1	.5-2
	5-10	35-60	1.35-1.60	<0.06	0.08-0.20	5.1-7.8	High	0.37		
	10-15	35-60	1.35-1.60	<0.06	0.05-0.15	5.6-7.8	High	0.32		
	15-30	---	---	---	---	---	-----------	----		
76 Tuskahoma	0-5	10-18	1.30-1.55	0.2-2.0	0.15-0.24	5.6-7.8	Low	0.32	1	.5-2
	5-10	35-60	1.35-1.60	<0.06	0.08-0.20	5.1-7.8	High	0.32		
	10-15	35-60	1.35-1.60	<0.06	0.05-0.15	5.6-7.8	High	0.32		
	15-30	---	---	---	---	---	-----------	----		
77, 78 Vian	0-18	18-26	1.30-1.50	0.6-2.0	0.15-0.24	4.5-6.0	Low	0.37	5	.5-2
	18-23	18-35	1.40-1.70	0.2-0.6	0.15-0.24	4.5-5.5	Moderate	0.37		
	23-65	27-35	1.45-1.70	0.2-0.6	0.16-0.20	4.5-5.5	Moderate	0.32		
79 Wabbaseka	0-18	30-50	1.20-1.50	<0.06	0.12-0.18	6.6-7.8	High	0.37	5	1-3
	18-61	10-25	1.30-1.60	2.0-6.0	0.11-0.20	6.1-8.4	Low	0.49		
80, 81 Wetsaw	0-10	5-20	1.30-1.60	0.6-2.0	0.08-0.18	5.1-6.5	Low	0.24	5	<1
	10-33	20-35	1.40-1.65	0.6-2.0	0.08-0.18	4.5-5.5	Low	0.32		
	33-48	20-55	1.40-1.70	0.6-2.0	0.02-0.12	4.5-5.5	Moderate	0.32		
	48-65	40-55	1.35-1.60	0.06-0.2	0.10-0.18	4.5-5.5	High	0.32		
82 Wing	0-6	10-20	1.25-1.50	0.2-0.6	0.16-0.24	5.1-6.5	Low	0.49	1	.5-3
	6-70	32-60	1.20-1.50	<0.06	0.02-0.06	5.1-9.0	High	0.49		
83, 84, 85 Wister	0-15	15-26	1.30-1.55	0.6-2.0	0.16-0.24	4.5-6.5	Low	0.49	4	.5-1
	15-53	35-60	1.35-1.65	<0.06	0.14-0.22	4.5-8.4	High	0.37		
	53-64	---	---	---	---	---	-----------	----		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
1 Bengal	C	None	---	---	>6.0	---	---	20-40	Soft	High	High.
2:*											
Bengal	C	None	---	---	>6.0	---	---	20-40	Soft	High	High.
Clebit	D	None	---	---	>6.0	---	---	10-20	Hard	Low	Moderate.
3:*											
Bengal	C	None	---	---	>6.0	---	---	20-40	Soft	High	High.
Octavia	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
4:*											
Bengal	C	None	---	---	>6.0	---	---	20-40	Soft	High	High.
Octavia	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
Tuskahoma	D	None	---	---	0.5-1.5	Perched	Nov-Apr	10-20	Soft	High	Moderate.
5:*											
Bengal	C	None	---	---	>6.0	---	---	20-40	Soft	High	High.
Pirum	B	None	---	---	>6.0	---	---	22-50	Hard	Low	High.
Clebit	D	None	---	---	>6.0	---	---	10-20	Hard	Low	Moderate.
6, 7 Carnasaw	C	None	---	---	>6.0	---	---	40-60	Soft	High	High.
8:*											
Carnasaw	C	None	---	---	>6.0	---	---	40-60	Soft	High	High.
Clebit	D	None	---	---	>6.0	---	---	10-20	Hard	Low	Moderate.
9,* 10:*											
Carnasaw	C	None	---	---	>6.0	---	---	40-60	Soft	High	High.
Octavia	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
11,* 12:*											
Carnasaw	C	None	---	---	>6.0	---	---	40-60	Soft	High	High.
Pirum	B	None	---	---	>6.0	---	---	22-50	Hard	Low	High.
13:*											
Ceda	B	Frequent	Very brief	Jan-Jul	>6.0	---	---	>60	---	Low	Moderate.
Rubble land.											
14, 15 Clebit	D	None	---	---	>6.0	---	---	10-20	Hard	Low	Moderate.
16:*											
Clebit	D	None	---	---	>6.0	---	---	10-20	Hard	Low	Moderate.
Carnasaw	C	None	---	---	>6.0	---	---	40-60	Soft	High	High.
Pirum	B	None	---	---	>6.0	---	---	22-50	Hard	Low	High.
17, 18, 19 Coushatta	B	Rare	---	---	4.0-6.0	Apparent	Nov-Jun	>60	---	Moderate	Low.
20 Coushatta	B	Rare	---	---	5.0-6.0	---	---	>60	---	Moderate	Low.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
21, 22: Cowton	C	None	---	---	>6.0	---	---	20-40	Soft	High	Moderate.
23: Crevasse	A	Rare	---	---	4.0-6.0	Apparent	Nov-Mar	>60	---	Low	Moderate.
24: Cupco	C	Occasional	Very brief	Nov-Jun	0.5-2.0	Perched	Nov-Jun	>60	---	High	Moderate.
25: Garton	C	Rare	---	---	2.0-3.0	Perched	Nov-Jun	>60	---	High	Low.
26, 27: Kamie	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
28: Kanima	C	None	---	---	>6.0	---	---	>60	---	Moderate	Low.
29:*											
Kenn	B	Occasional	Very brief	Nov-Jun	>6.0	---	---	>60	---	Moderate	Moderate.
Ceda	B	Occasional	Very brief	Nov-Jun	>6.0	---	---	>60	---	Low	Moderate.
30, 31: Kiomatia	A	Rare	---	---	4.0-5.0	Apparent	Nov-Jun	>60	---	Low	Low.
32: Latanier	D	Rare	---	---	1.0-3.0	Apparent	Nov-Jun	>60	---	High	Low.
33: Lela	D	Rare	---	---	1.0-3.0	Apparent	Nov-Jun	>60	---	High	Low.
34, 35: Lela	D	Rare	---	---	0-2.0	Apparent	Nov-Jun	>60	---	High	Low.
36: Lynnville Variant	C	Occasional	Brief	Nov-Jun	1.0-3.0	Apparent	Nov-Jun	>60	---	High	Low.
37, 38: McKamie	D	None	---	---	>6.0	---	---	>60	---	High	Moderate.
39, 40: Moreland	D	Rare	---	---	0-1.5	Perched	Nov-Jun	>60	---	High	Low.
41: Moreland	D	Frequent	Very brief to brief.	Nov-Jun	0-1.5	Perched	Nov-Jun	>60	---	High	Low.
42: Neff	C	Occasional	Very brief to brief.	Nov-Jun	0.5-2.5	Perched	Nov-Jun	>60	---	High	Moderate.
43:*											
Neff	C	Frequent	Very brief to brief.	Nov-Jun	0.5-2.5	Perched	Nov-Jun	>60	---	High	Moderate.
Rexor	A	Frequent	Very brief	Nov-Jun	3.0-5.0	Perched	Nov-Jun	>60	---	Moderate	Moderate.
44, 45, 46: Norwood	B	Rare	---	---	>6.0	---	---	>60	---	High	Low.
47: Octavia	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
48:*											
Octavia	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
Carnasaw	C	None	---	---	>6.0	---	---	40-60	Soft	High	High.
49: Oklared	B	Rare	---	---	4.0-5.0	Apparent	Nov-Jun	>60	---	Moderate	Low.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
50:*											
Pirum	B	None	---	---	>6.0	---	---	22-50	Hard	Low	High.
Carnasaw	C	None	---	---	>6.0	---	---	40-60	Soft	High	High.
Caston	B	None	---	---	>6.0			>60	---	Moderate	High.
51,* 52:*											
Pirum	B	None	---	---	>6.0	---	---	22-50	Hard	Low	High.
Clebit	D	None	---	---	>6.0	---	---	10-20	Hard	Low	Moderate.
53:*											
Pirum	B	None	---	---	>6.0	---	---	22-50	Hard	Low	High.
Octavia	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
Panama	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
54 Pocola	D	Occasional	Very brief	Nov-Jun	0.5-2.0	Perched	Nov-Jun	>60	---	High	Moderate.
55. Psamments											
56 Redport	B	Rare	---	---	>6.0	---	---	>60	---	Moderate	Low.
57 Rexor	A	Occasional	Very brief	Nov-Jun	3.0-5.0	Perched	Nov-Jun	>60	---	Moderate	Moderate.
58 Roxana	B	Rare	---	---	4.0-6.0	Apparent	Nov-Jun	>60	---	Low	Low.
59, 60, 61, 62 Sallisaw	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
63 Severn	B	Rare	---	---	>6.0	---	---	>60	---	Low	Low.
64:*											
Sherless	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate.
Bengal	C	None	---	---	>6.0	---	---	20-40	Soft	High	High.
65, 66, 67, 68 Shermore	B	None	---	---	1.5-3.5	Perched	Nov-Jun	>60	---	Moderate	High.
69 Speer	B	Occasional	Very brief	Nov-Jun	>6.0	---	---	>60	---	Moderate	Moderate.
70:*											
Speer	B	Occasional	Very brief	Nov-Jun	>6.0	---	---	>60	---	Moderate	Moderate.
Neff	C	Occasional	Very brief to brief.	Nov-Jun	0.5-2.5	Perched	Nov-Jun	>60	---	High	Moderate.
71, 72, 73, 74 Stigler	D	None	---	---	2.0-3.0	Perched	Nov-Jun	>60	---	High	High.
75, 76 Tuskahoma	D	None	---	---	0.5-1.5	Perched	Nov-Jun	10-20	Soft	High	Moderate.
77, 78 Vian	B	None	---	---	2.0-3.0	Perched	Nov-Jun	>60	---	High	Moderate.
79 Wabbaseka	D	Rare	---	---	>6.0	---	---	>60	---	Moderate	Low.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
80, 81------------ Wetsaw	C	None--------	---	---	1.5-2.5	Apparent	Nov-Jun	>60	---	Moderate	High.
82---------------- Wing	D	None--------	---	---	0.5-1.0	Perched	Jan-Apr	>60	---	High-----	Moderate.
83, 84, 85-------- Wister	C	None--------	---	---	1.0-2.0	Perched	Nov-Jun	40-60	Soft	High-----	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--PHYSICAL ANALYSES OF SELECTED SOILS

Soil series and sample number	Depth	Horizon	Particle distribution							
			Very coarse sand (2.0-1.0 mm)	Coarse sand (1.0-0.5 mm)	Medium sand (0.5-0.25 mm)	Fine sand (0.25-0.10 mm)	Very fine sand (0.10-0.05 mm)	Total sand (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)
	In		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct
Bengal:[1] 68-OK-79-2 (1-8)	0-3	A1	---	---	---	---	11.4	43.4	41.4	15.2
	3-13	A2	---	---	---	---	11.4	43.5	37.6	18.9
	13-21	B21t	---	---	---	---	1.8	6.1	42.5	51.4
	21-29	B22t	---	---	---	---	1.3	8.1	40.3	51.5
	29-40	B3	---	---	---	---	0.3	2.6	43.1	54.3
	40-50	Cr	---	---	---	---	0.9	3.9	43.1	53.0
	50-70	Cr2	---	---	---	---	1.4	6.5	49.6	43.9
	70+	Cr3	---	---	---	---	1.5	6.4	52.5	41.1
Carnasaw: 76-OK-79-2 (1-7)	0-4	A1	4.0	4.2	3.0	3.0	5.8	20.0	59.3	20.8
	4-6	A2	3.2	2.4	1.1	2.1	5.9	14.6	67.8	17.6
	6-14	B21t	1.5	1.1	0.4	0.9	2.2	6.0	47.9	46.1
	14-27	B22t	1.8	0.8	0.4	0.6	2.2	5.7	43.5	50.9
	27-36	B23t	0.6	0.3	0.2	0.2	0.2	1.4	31.8	66.8
	36-53	B3	0.6	0.4	0.3	0.2	0.2	1.7	51.7	46.6
	53-70	Cr	0.7	0.3	0.2	0.1	0.1	1.3	68.3	30.4
Cowton:[1] 68-OK-79-3 (1-5)	0-10	A1	---	---	---	---	12.1	27.6	46.9	25.5
	10-20	B21t	---	---	---	---	2.0	4.6	30.8	64.6
	10-30	B22t	---	---	---	---	1.3	4.7	29.0	66.3
	30-35	B3	---	---	---	---	2.5	5.8	41.4	52.8
	35-45	Cr	---	---	---	---	---	---	---	---
Neff:[2] 74-OK-79-6 (1-6)	0-14	A1	0.1	0.1	0.3	8.4	16.8	25.6	52.5	21.9
	14-23	B1	0.1	0.1	0.1	5.5	13.0	18.8	56.7	24.4
	23-40	B2t	0.1	0.1	0.2	1.5	5.5	7.3	64.5	28.2
	40-57	B2t	0.1	0.1	0.3	1.2	6.8	8.4	61.5	30.0
	57-72	B3	0.1	0.1	0.1	1.8	12.6	14.7	57.1	28.2
	72-82	B3	0.1	0.1	0.1	2.1	12.7	15.1	56.7	28.2
Octavia: 80-OK-40-26 (1-5)	0-8	A1	1.9	1.2	19.8	34.5	9.5	66.9	20.6	12.5
	8-15	A2	1.6	1.2	11.8	27.8	9.8	52.2	39.3	8.5
	15-33	B1	1.0	1.2	18.3	28.7	9.0	58.0	30.0	12.0
	33-61	B21t	1.0	0.9	9.3	28.4	8.6	48.0	27.7	24.3
	61-81	B22t	1.1	0.7	8.4	22.5	7.8	40.6	21.9	37.5
Pirum: 80-OK-40-26 (1-5)	0-10	A1	1.7	0.6	5.1	36.6	8.9	52.7	33.6	13.6
	10-20	A2	1.0	0.4	5.9	31.1	8.4	46.8	38.9	14.2
	20-43	B1	1.1	0.4	4.2	28.5	7.4	41.6	42.4	16.0
	43-53	B21t	1.7	0.6	3.3	26.7	8.1	40.3	37.9	21.7
	53-66	B22t	2.1	0.9	4.2	26.0	8.0	41.2	31.1	27.8
Shermore: 75-OK-79-2 (1-8)	0-5	Ap	1.2	0.8	0.9	23.5	26.3	52.7	40.8	6.5
	5-10	A2	0.6	0.7	0.9	22.3	24.2	48.7	40.7	10.6
	10-20	B21t	0.6	0.6	0.8	18.7	19.4	40.1	39.5	20.4
	20-31	B22t	2.2	1.9	1.5	15.8	13.4	34.8	43.1	22.1
	31-47	Bx1	0.8	0.9	1.4	17.9	14.7	35.7	41.3	23.0
	47-60	Bx2	0.6	0.9	0.9	10.1	11.5	24.0	44.5	31.5
	60-64	Bx3	0.1	0.2	0.6	10.5	10.8	22.2	42.1	35.7
	64-80	Bx4	2.6	1.3	0.8	8.6	9.6	22.9	40.0	37.1

See footnotes at end of table.

TABLE 18.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil series and sample number	Depth	Horizon	Particle distribution							
			Very coarse sand (2.0-1.0 mm)	Coarse sand (1.0-0.5 mm)	Medium sand (0.5-0.25 mm)	Fine sand (0.25-0.10 mm)	Very fine sand (0.10-0.05 mm)	Total sand (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)
	In		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct
Stigler:	0-10	A1	1.5	1.1	0.7	1.2	2.6	7.1	74.1	18.8
80-OK-79-1 (1-5)	10-22	A2	2.2	1.4	0.7	1.2	2.8	8.2	74.0	17.8
	22-40	B21t	0.5	0.2	0.1	0.5	1.3	2.5	43.2	54.3
	40-63	B22t	0.5	0.3	0.2	0.7	1.9	3.5	43.8	52.7
	63-64	B23t	0.3	0.2	0.4	1.2	2.4	4.4	46.4	49.2
Tuskahoma:[3]	0-5	A1	2.9	3.5	3.9	7.6	13.1	31.0	44.4	24.6
76-OK-79-6 (1-3)	5-10	B2t	0.4	0.8	1.0	1.5	1.9	5.8	25.4	68.9
	10-15	B3	0.5	1.2	1.8	1.0	0.9	5.4	37.0	57.6
Wetsaw:[3]	0-6	A1	0.6	1.3	8.6	24.2	12.6	47.3	46.2	6.5
76-OK-79-4 (1-6)	6-10	A2	0.3	1.0	9.1	25.3	14.0	49.7	42.5	7.8
	10-23	B21t	0.2	0.7	5.4	17.1	10.3	33.7	39.7	26.6
	23-33	B22t	0.7	1.0	5.5	17.6	10.9	35.7	43.8	20.5
	33-48	IIB23t	0.2	0.6	4.5	13.8	8.5	27.6	27.6	44.8
	48-65	IIB24t	0.2	0.3	2.6	12.0	12.7	27.7	29.4	42.9
Wing:[1, 3]	0-6	A1	---	---	---	---	1.0	22.9	66.7	10.4
67-OK-79-1 (1-7)	6-16	B21t	---	---	---	---	0.5	12.9	41.1	46.0
	16-29	B22t	---	---	---	---	0.4	5.8	36.6	57.6
	29-41	B23t	---	---	---	---	0.7	12.1	33.8	54.1
	41-56	B24t	---	---	---	---	0.4	16.0	34.6	49.4
	56-70	C	---	---	---	---	0.3	16.3	35.7	48.0
	70-82	Cr	---	---	---	---	1.2	18.2	59.4	22.4

[1] Determinations were not made for the different sand fractions from 2 to 0.10 millimeters.

[2] Typical pedon for the series. The B3 horizon was subdivided for sample testing.

[3] Typical pedon for the series.

TABLE 19.--CHEMICAL ANALYSES OF SELECTED SOILS

Soil series and sample number	Depth	Horizon	Extractable bases (Milliequivalents per 100 grams of soil) Ca	Mg	K	Na	Cation exchange capacity	Base saturation[1]	Reaction (1:1 soil: water)	Organic matter	Total phosphorus
	In							Pct	pH	Pct	Ppm
Bengal: 68-OK-79-2 (1-8)	0-3	A1	8.83	2.71	0.28	0.09	13.9	71	6.9	3.3	---
	3-13	A2	4.10	1.30	0.09	0.09	7.0	62	5.7	0.8	---
	13-21	B21t	2.03	5.43	0.10	0.09	18.8	37	5.1	0.5	---
	21-29	B22t	1.18	4.89	0.10	0.13	20.9	28	4.9	0.5	---
	29-40	B3	1.10	5.90	0.10	0.24	23.5	29	4.6	0.4	---
	40-50	C1	1.78	6.53	0.11	0.39	23.9	36	4.0	0.3	---
	50-70	Cr1	2.41	8.50	0.15	0.39	21.3	45	4.8	0.3	---
	70+	Cr2	2.94	8.70	0.11	0.52	19.3	56	4.9	0.4	---
Carnasaw: 76-OK-79-2 (1-7)	0-4	A1	1.57	1.99	0.31	0.22	19.3	20	5.1	5.1	409
	4-6	A2	0.03	1.20	0.11	0.13	11.7	15	5.1	1.2	302
	6-14	B21t	0.76	3.10	0.32	0.13	20.7	25	5.0	0.8	260
	14-27	B22t	0.89	3.73	0.29	0.17	24.3	20	5.0	0.6	214
	27-36	B23t	0.42	7.12	0.36	0.46	36.5	25	5.0	0.6	166
	36-53	B3	0.30	7.63	0.38	0.48	30.0	30	4.9	0.6	284
	53-70	Cr	0.38	9.41	0.52	0.61	21.4	41	5.0	0.8	564
Cowton: 68-OK-79-3 (1-5)	0-10	A1	3.67	2.35	0.09	0.09	12.8	38	5.1	2.7	---
	10-20	B21t	1.70	1.40	0.08	0.09	18.5	15	4.7	1.2	---
	20-30	B22t	1.57	2.21	0.08	0.22	22.5	18	5.0	1.4	---
	30-35	B3	1.99	4.98	0.10	0.59	19.8	35	4.9	0.6	---
	35-45	Cr	3.57	11.19	0.10	0.87	21.3	91	5.2	0.5	---
Neff:[2] 74-OK-79-6 (1-6)	0-14	A1	7.77	1.47	0.11	0.15	9.7	72	7.3	1.6	---
	14-23	B1	1.64	2.02	0.10	0.13	9.6	30	5.2	0.7	---
	23-40	B2t	2.23	2.98	0.12	0.13	11.9	36	5.2	0.6	---
	40-57	B2t	2.14	3.15	0.12	0.15	11.8	37	5.2	0.4	---
	57-72	B3	1.72	2.86	0.11	0.17	10.4	35	5.2	0.4	---
	72-82	B3	1.64	2.90	0.11	0.17	11.0	34	5.0	0.6	---
Octavia: 80-OK-40-26 (1-5)	0-8	A1	0.41	0.54	0.04	0.07	10.0	12	4.1	3.09	---
	8-15	A2	0.32	0.47	0.02	0.04	7.8	12	4.3	2.56	---
	15-33	B1	0.25	0.23	0.02	0.03	5.7	12	4.2	0.72	---
	33-61	B21	0.25	0.17	0.04	0.03	12.1	8	4.0	0.42	---
	61-81	B22	0.17	0.16	0.11	0.04	19.0	8	4.0	0.42	---
Pirum: 80-OK-79-24 (1-5)	0-10	A1	1.22	0.84	0.16	0.04	10.5	25	5.1	3.28	---
	10-20	A2	0.17	0.33	0.10	0.02	7.6	9	4.6	1.13	---
	20-43	B1	0.17	0.31	0.11	0.05	6.4	11	4.6	0.60	---
	43-53	B21	0.17	0.37	0.15	0.02	7.4	10	4.5	0.66	---
	53-66	B22	0.17	0.37	0.24	0.02	12.0	7	4.6	0.67	---

See footnotes at end of table.

TABLE 19.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil series and sample number	Depth	Horizon	Extractable bases (Milliequivalents per 100 grams of soil)				Cation exchange capacity	Base saturation[1]	Reaction (1:1 soil: water)	Organic matter	Total phosphorus
			Ca	Mg	K	Na					
	In							Pct	pH	Pct	Ppm
Shermore: 75-OK-79-2 (4, 7)	20-31	B22t	0.20	2.40	0.20	0.50	---	---	---	---	---
	60-64	Bx3	1.60	5.30	0.20	0.50	---	---	---	---	---
Stigler: 80-OK-79-1 (1-5)	0-10	A1	1.73	1.48	0.09	0.26	14.8	24	5.2	3.2	---
	10-22	A2	0.66	0.49	0.07	0.42	9.9	22	5.7	1.0	---
	22-40	B21t	2.84	4.99	0.17	3.59	24.0	48	5.5	1.2	---
	40-63	B22t	3.83	7.00	0.23	5.34	25.1	65	5.3	0.7	---
	63-64	B23t	4.04	6.96	0.24	5.71	24.4	68	5.1	0.5	---
Tuskahoma:[2] 76-OK-79-6 (1-4)	0-5	A1	4.62	3.10	0.45	0.78	14.4	50	5.8	3.9	395
	5-10	B2t	6.53	9.84	0.48	1.64	22.3	61	5.5	1.8	310
	10-15	B3	6.40	9.58	0.48	1.81	18.3	78	6.2	0.9	395
	15-30	Cr	6.06	8.73	0.65	1.90	15.4	92	7.9	0.3	717
Wetsaw:[2] 76-OK-79-4 (1-6)	0-6	A1	1.78	0.68	0.09	0.08	9.5	40	5.4	3.1	119
	6-10	A2	0.93	0.68	0.06	0.07	5.5	77	5.5	0.4	81
	10-23	B21t	1.61	2.54	0.16	0.12	17.6	33	5.0	0.7	202
	23-33	B22t	0.68	1.31	0.16	0.11	18.3	15	4.9	0.5	208
	33-48	IIB23t	0.72	1.78	0.18	0.22	18.3	19	4.9	0.3	144
	48-65	IIB24t	3.94	5.85	0.33	0.70	30.5	45	4.8	0.3	84
Wing:[2, 3] 67-OK-79-1 (1-7)	0-6	A1	3.30	2.20	0.08	0.61	12.2	51	5.3	2.1	---
	6-16	B21t	5.90	9.10	0.23	6.68	26.0	84	5.3	1.5	---
	16-29	B22t	6.90	11.50	0.25	12.70	30.0	103	7.0	1.5	---
	29-41	B23t	7.40	10.40	0.23	12.05	28.1	110	7.7	0.1	---
	41-56	B24t	6.10	11.70	0.25	10.20	28.0	101	7.8	---	---
	56-70	C	11.20	10.90	0.20	8.30	26.5	115	8.5	---	---
	70-82	Cr	12.30	10.50	0.13	3.20	23.0	122	8.2	---	---

1 By sum of cations.
2 Typical pedon for the series.
3 Base saturation by sodium acetate method (5A2).

TABLE 20.--ENGINEERING INDEX TEST DATA

[Dashes indicate data were not available. NP means nonplastic]

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution							Liquid limit	Plastic-ity index	Shrinkage		
	AASHTO	Unified	Percentage passing sieve--					Percentage passing sieve--				Limit	Linear	Ratio
			3/8 inch	No. 4	No. 10	No. 40	No. 200	.005 mm	.002 mm	Pct		Pct	Pct	Pct
Carnasaw stony loam:[1]														
(S75OK-079-001)														
A---------0 to 4	A-5 (06)	ML	100	100	72	68	67	21	11	41	9	27	20	1.5
B21t------6 to 14	A-7-6(17)	CL	100	100	82	79	77	47	38	47	22	16	56	1.8
B3-------36 to 53	A-7-6(25)	CL	100	100	100	99	98	61	48	48	22	15	62	1.9
Sallisaw loam:[2]														
(S75OK-079-079)														
Ap--------0 to 7	A-4 (00)	ML	100	100	100	97	83	11	7	---	NP	0	0	0
B2t------14 to 42	A-7-6(21)	CL	100	100	100	98	89	42	38	42	23	12	58	1.9
IIB3-----42 to 62	A-6 (09)	CL	100	100	70	65	57	29	25	40	20	13	51	1.9
Tuskahoma stony loam:[3]														
(S75OK-079-004)														
A1--------0 to 4	A-4 (03)	ML	100	100	71	63	51	18	12	35	8	19	27	1.7
B2t-------4 to 11	A-7-6(34)	CH	100	100	100	99	96	81	66	58	29	15	80	1.9
Wetsaw fine sandy loam:[4]														
(S75OK-079-005)														
A1--------0 to 6	A-4 (00)	ML	100	100	100	98	63	13	7	25	1	19	10	---
B21t-----10 to 23	A-6 (09)	CL	100	100	97	96	69	40	37	35	15	12	45	2.0
B22t-----23 to 33	A-6 (08)	CL	100	100	87	86	63	35	32	37	16	14	43	1.9
IIB23t---33 to 48	A-7-6(08)	SC	100	100	63	62	48	34	33	51	25	14	70	1.9
Wister silt loam:[5]														
(S75OK-079-006)														
A1--------0 to 7	A-4 (08)	ML	100	100	100	95	92	33	21	35	7	21	23	1.6
B21t-----15 to 34	A-7-6(34)	MH	100	100	100	99	96	69	61	59	28	17	75	1.8
B22t-----34 to 53	A-7-6(34)	CH	100	100	100	98	95	63	54	57	31	14	83	1.9

[1] This pedon is a taxadjunct to the series because the liquid limit of the A1 horizon is slightly higher than allowed for the series.

[2] This pedon is a taxadjunct to the series because the clay content of the B2t horizon is slightly higher than allowed for the series, and the IIB3 horizon has slightly less coarse fragments than allowed for the series.

[3] This pedon is a taxadjunct to the series because the clay content of the B2t horizon is slightly higher than allowed for the series.

[4] This pedon is a taxadjunct to the series because the clay content of the texture control section is slightly higher than allowed for the series.

[5] This pedon is a taxadjunct to the series because the liquid limit of the A1 horizon is slightly higher than allowed for the series.

TABLE 21.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Bengal	Clayey, mixed, thermic Typic Hapludults
Carnasaw	Clayey, mixed, thermic Typic Hapludults
Caston	Loamy-skeletal, siliceous, thermic Typic Paleudults
Ceda	Loamy-skeletal, siliceous, nonacid, thermic Typic Udifluvents
Clebit	Loamy-skeletal, siliceous, thermic Lithic Dystrochrepts
Coushatta	Fine-silty, mixed, thermic Fluventic Eutrochrepts
Cowton	Fine, mixed, thermic Ultic Hapludalfs
Crevasse	Mixed, thermic Typic Udipsamments
Cupco	Fine-silty, siliceous, thermic Aeric Ochraqualfs
Garton	Fine, mixed, thermic Aquic Argiudolls
Kamie	Fine-loamy, mixed, thermic Typic Paleudalfs
Kanima	Loamy-skeletal, mixed, nonacid, thermic Udalfic Arents
Kenn	Fine-loamy, siliceous, thermic Ultic Hapludalfs
Kiomatia	Sandy, mixed, thermic Typic Udifluvents
Latanier	Clayey over loamy, mixed, thermic Vertic Hapludolls
Lela	Fine, mixed, thermic Typic Chromuderts
Lynnville Variant	Fine-silty, mixed, thermic Fluvaquentic Hapludolls
McKamie	Fine, mixed, thermic Vertic Hapludalfs
Moreland	Fine, mixed, thermic Vertic Hapludolls
Neff	Fine-silty, siliceous, thermic Aquultic Hapludalfs
Norwood	Fine-silty, mixed (calcareous), thermic Typic Udifluvents
Octavia	Fine-loamy, siliceous, thermic Typic Paleudults
Oklared	Coarse-loamy, mixed (calcareous), thermic Typic Udifluvents
Panama	Loamy-skeletal, siliceous, thermic Typic Paleudults
Pirum	Fine-loamy, siliceous, thermic Typic Hapludults
Pocola	Fine, mixed, thermic Vertic Ochraqualfs
Psamments	Mixed, thermic Typic Udipsamments
*Redport	Fine-silty, mixed, thermic Cumulic Hapludolls
Rexor	Fine-silty, siliceous, thermic Ultic Hapludalfs
Roxana	Coarse-silty, mixed, nonacid, thermic Typic Udifluvents
Sallisaw	Fine-loamy, siliceous, thermic Typic Paleudalfs
Severn	Coarse-silty, mixed (calcareous), thermic Typic Udifluvents
Sherless	Fine-loamy, mixed, thermic Typic Hapludults
Shermore	Fine-loamy, siliceous, thermic Typic Fragiudalfs
Speer	Fine-loamy, siliceous, thermic Ultic Hapludalfs
Stigler	Fine, mixed, thermic Aquic Paleudalfs
Tuskahoma	Clayey, mixed, thermic, shallow Albaquic Hapludalfs
Vian	Fine-silty, siliceous, thermic Aquic Paleudalfs
Wabbaseka	Clayey over loamy, mixed, thermic Fluventic Hapludolls
Wetsaw	Fine-loamy, siliceous, thermic Aquic Paleudalfs
Wing	Fine, mixed, thermic Aquic Natrustalfs
Wister	Fine, mixed, thermic Albaquic Hapludalfs

*The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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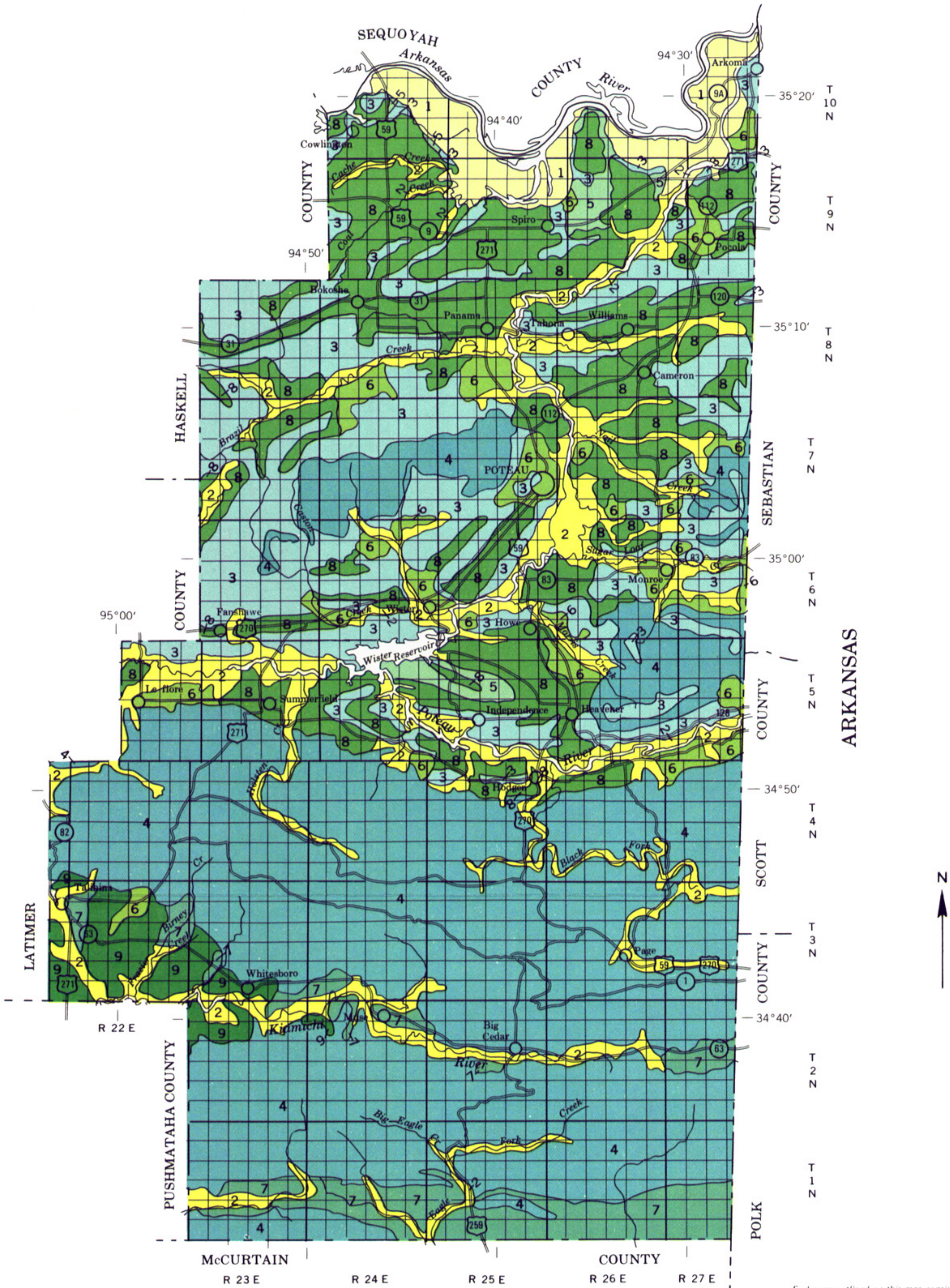


Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

LEGEND

DEEP, SOMEWHAT POORLY DRAINED TO WELL DRAINED, LOAMY AND CLAYEY SOILS; ON FLOOD PLAINS

1 — Moreland-Coushatta-Oklared: Nearly level to gently undulating, somewhat poorly drained and well drained, loamy and clayey soils that have a loamy or clayey subsoil or that have loamy underlying layers; on flood plains

2 — Neff-Kenn-Ceda: Nearly level to very gently sloping, moderately well drained and well drained, loamy soils that have a loamy subsoil or that have cobbly and loamy underlying layers; on flood plains

DEEP TO SHALLOW, WELL DRAINED, STONY SOILS; ON RIDGES AND MOUNTAINS

3 — Bengal-Clebit-Pirum: Moderately deep and shallow, very gently sloping to steep, well drained, stony soils that have a clayey or loamy subsoil over shale or sandstone; on ridges and mountains

4 — Carnasaw-Octavia-Pirum: Deep and moderately deep, very gently sloping to steep, well drained, stony soils that have a clayey and loamy subsoil over shale or sandstone; on ridges and mountains

DEEP TO SHALLOW, WELL DRAINED AND MODERATELY WELL DRAINED, SANDY AND LOAMY SOILS; ON UPLANDS

5 — Kamie-McKamie: Deep, gently sloping to strongly sloping, well drained, sandy and loamy soils that have a loamy or clayey subsoil; on stream terraces

6 — Sallisaw-Stigler: Deep, nearly level to moderately steep, well drained and moderately well drained, loamy soils that have a loamy or clayey subsoil; on uplands

7 — Sherless-Wetsaw-Bengal: Deep and moderately deep, very gently sloping to moderately steep, well drained and moderately well drained, loamy soils that have a loamy subsoil over sandstone, alluvium, or shale; on uplands

8 — Stigler-Shermore-Wister: Deep, nearly level to sloping, moderately well drained, loamy soils that have a loamy or clayey subsoil over colluvium or shale; on uplands

9 — Tuskahoma-Wister: Shallow and deep, nearly level to moderately steep, moderately well drained, stony and loamy soils that have a clayey subsoil over shale; on uplands

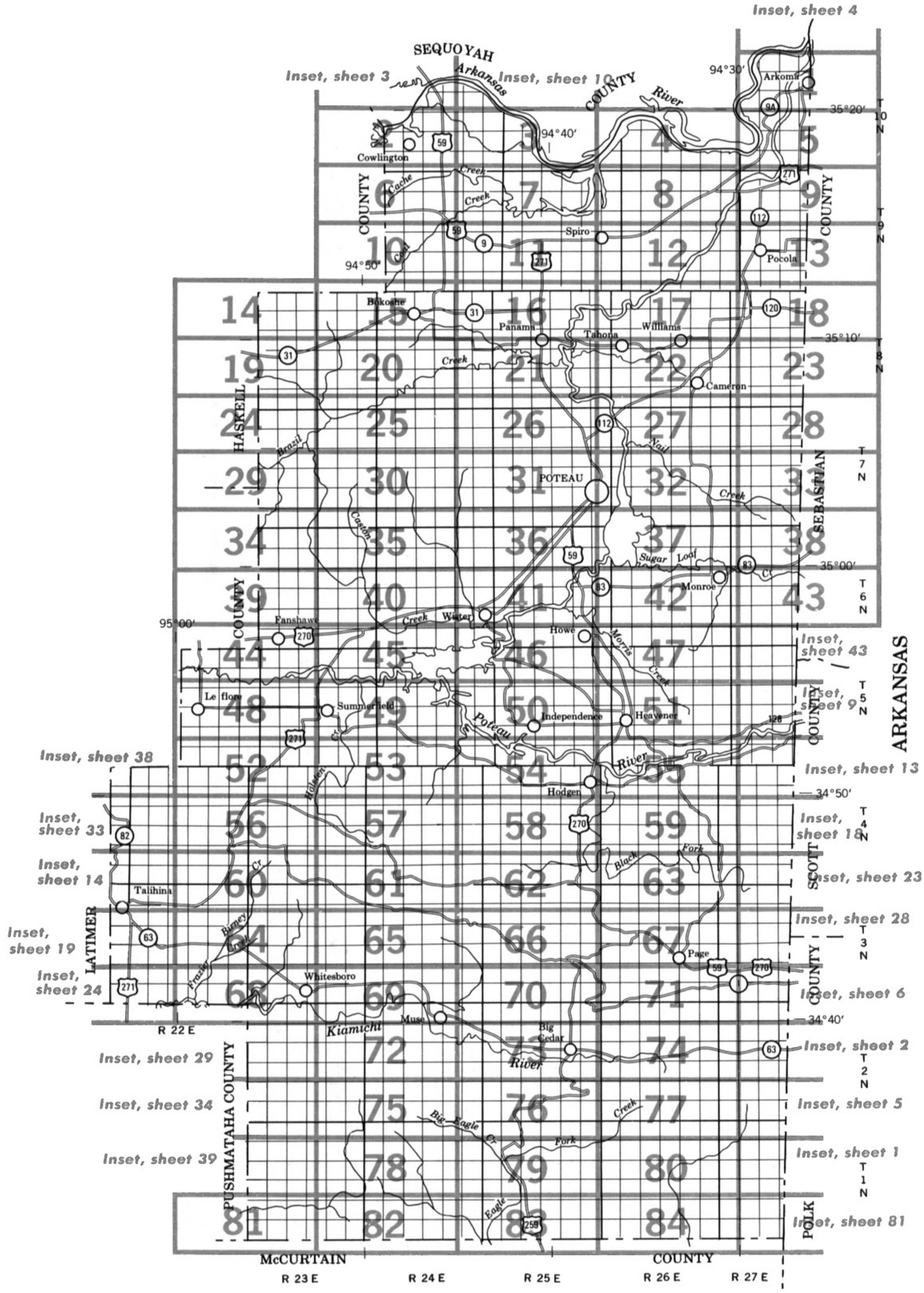
Compiled 1982

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
AND FOREST SERVICE
IN COOPERATION WITH
OKLAHOMA AGRICULTURAL
EXPERIMENT STATION

GENERAL SOIL MAP
LE FLORE COUNTY
OKLAHOMA

Scale 1:380,160

1 0 1 2 3 4 5 6 Miles



Original text from each individual map sheet read:
This soil survey map was compiled by U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies on 1976 orthophotography obtained from the U.S. Department of the Interior, Geological Survey.

INDEX TO MAP SHEETS
LE FLORE COUNTY
OKLAHOMA

Scale 1: 380,160

1 0 1 2 3 4 5 6 Miles

SOIL LEGEND

The publication symbols are numeric and the map unit names are in alphabetical order. Soils without a slope designation in the name are those that are nearly level soils. Soil names followed by the superscript 1/ are broadly defined units. The composition of these units is more variable than that of other units in the survey area, but have been controlled well enough to be interpreted for the expected use of the soils.

SYMBOL	NAME
1	Bengal stony fine sandy loam, 15 to 35 percent slopes
2	Bengal-Clebit association, strongly sloping 1/
3	Bengal-Octavia complex, 15 to 40 percent slopes
4	Bengal-Octavia-Tuskahoma complex, 4 to 20 percent slopes
5	Bengal-Pirum-Clebit complex, 5 to 15 percent slopes
6	Carnasaw stony loam, 4 to 15 percent slopes
7	Carnasaw stony loam, 15 to 35 percent slopes
8	Carnasaw-Clebit complex, 4 to 15 percent slopes
9	Carnasaw-Octavia complex, 15 to 35 percent slopes
10	Carnasaw-Octavia complex, 35 to 50 percent slopes
11	Carnasaw-Pirum complex, 4 to 15 percent slopes
12	Carnasaw-Pirum complex, 15 to 35 percent slopes
13	Ceda-Rubble land complex, frequently flooded
14	Clebit stony fine sandy loam, 10 to 30 percent slopes
15	Clebit stony fine sandy loam, 30 to 60 percent slopes
16	Clebit-Carnasaw-Pirum complex, cool, 4 to 35 percent slopes
17	Coushatta silt loam, rarely flooded, 0 to 1 percent slopes
18	Coushatta silt loam, rarely flooded, undulating
20	Coushatta loamy fine sand, overwash, rarely flooded
21	Cowton lon loam, 2 to 5 percent slopes
22	Cowton loam, 5 to 15 percent slopes
23	Crevasse loamy fine sand, rarely flooded, undulating
24	Cupco silt loam, occasionally flooded
25	Garton silty clay loam, rarely flooded
26	Kamie loamy fine sand, 3 to 8 percent slopes
27	Kamie loamy fine sand, 3 to 8 percent slopes, eroded
28	Kanima shaly silty clay loam, 10 to 50 percent slopes
29	Kenn-Ceda Complex, occasionally flooded
30	Kiomatia fine sandy loam, rarely flooded
31	Kiomatia silty clay loam, rarely flooded
32	Latanier silty clay, rarely flooded
33	Lela very fine sandy loam, overwash, rarely flooded
34	Lela silty clay, rarely flooded, 0 to 1 percent slopes
35	Lela silty clay, rarely flooded, 1 to 3 percent slopes
36	Lynnville Variant silty clay, occasionally flooded
37	McKamie loam, 3 to 5 percent slope-
38	McKamie loam, 5 to 12 percent slopes, eroded
39	Moreland silty clay, rarely flooded
40	Moreland silty clay loam, rarely flooded
41	Moreland silty clay loam, frequently flooded
42	Neff silt loam, occasionally flooded
43	Neff and Rexor silt loams, frequently flooded
44	Norwood silty clay loam, rarely flooded, 0 to 1 percent slopes
45	Norwood silty clay loam, rarely flooded, undulating
46	Norwood loam, rarely flooded
47	Octavia stony loam, 10 to 25 percent slopes
48	Octavia-Carnasaw complex, cool, 15 to 35 percent slopes
49	Oklared fine sandy loam, rarely flooded
50	Pirum-Carnasaw-Caston complex, cool, 35 to 60 percent slopes
51	Pirum-Clebit complex, 2 to 5 percent slopes
52	Pirum-Clebit complex, 2 to 5 percent slopes, eroded
53	Pirum-Octavia-Panama association, steep 1/
54	Pocola silt loam, occasionally flooded
55	Psamments, rarely flooded, undulating
56	Redport silty clay loam, rarely flooded
57	Rexor silt loam, occasionally flooded
58	Roxana very fine sandy loam, rarely flooded
59	Sallisaw loam, 1 to 3 percent slopes
60	Sallisaw loam, 3 to 5 percent slopes
61	Sallisaw loam, 2 to 5 percent slopes, eroded
62	Sallisaw stony loam, 3 to 15 percent slopes
63	Severn very fine sandy loam, rarely flooded
64	Sherless-Bengal complex, 3 to 15 percent slopes
65	Shermore fine sandy loam, 1 to 3 percent slopes
66	Shermore fine sandy loam, 3 to 5 percent slopes
67	Shermore fine sandy loam, 2 to 5 percent slopes, eroded
68	Shermore fine sandy loam, 2 to 8 percent slopes, gullied
69	Speer fine sandy loam, occasionally flooded
70	Speer-Neff association, occasionally flooded, undulating 1/
71	Stigler silt loam, 0 to 1 percent slopes
72	Stigler silt loam, 1 to 3 percent slopes
73	Stigler silt loam, terrace, 0 to 1 percent slopes
74	Stigler silt loam, terrace, 1 to 3 percent slopes
75	Tuskahoma loam, 3 to 10 percent slopes
76	Tuskahoma stony loam, 2 to 15 percent slopes
77	Vian silt loam, 1 to 3 percent slopes
78	Vian silt loam, 3 to 5 percent slopes
79	Wabbaseka silty clay, rarely flooded
80	Wetsaw fine sandy loam, 1 to 3 percent slopes
81	Wetsaw fine sandy loam, 3 to 5 percent slopes
82	Wing silt loam, 0 to 2 percent slopes
83	Wister silt loam, 0 to 1 percent slopes
84	Wister silt loam, 1 to 3 percent slopes
85	Wister silt loam, 3 to 5 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool

Hedley Airstrip

FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water

w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — 7 9

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown) — S

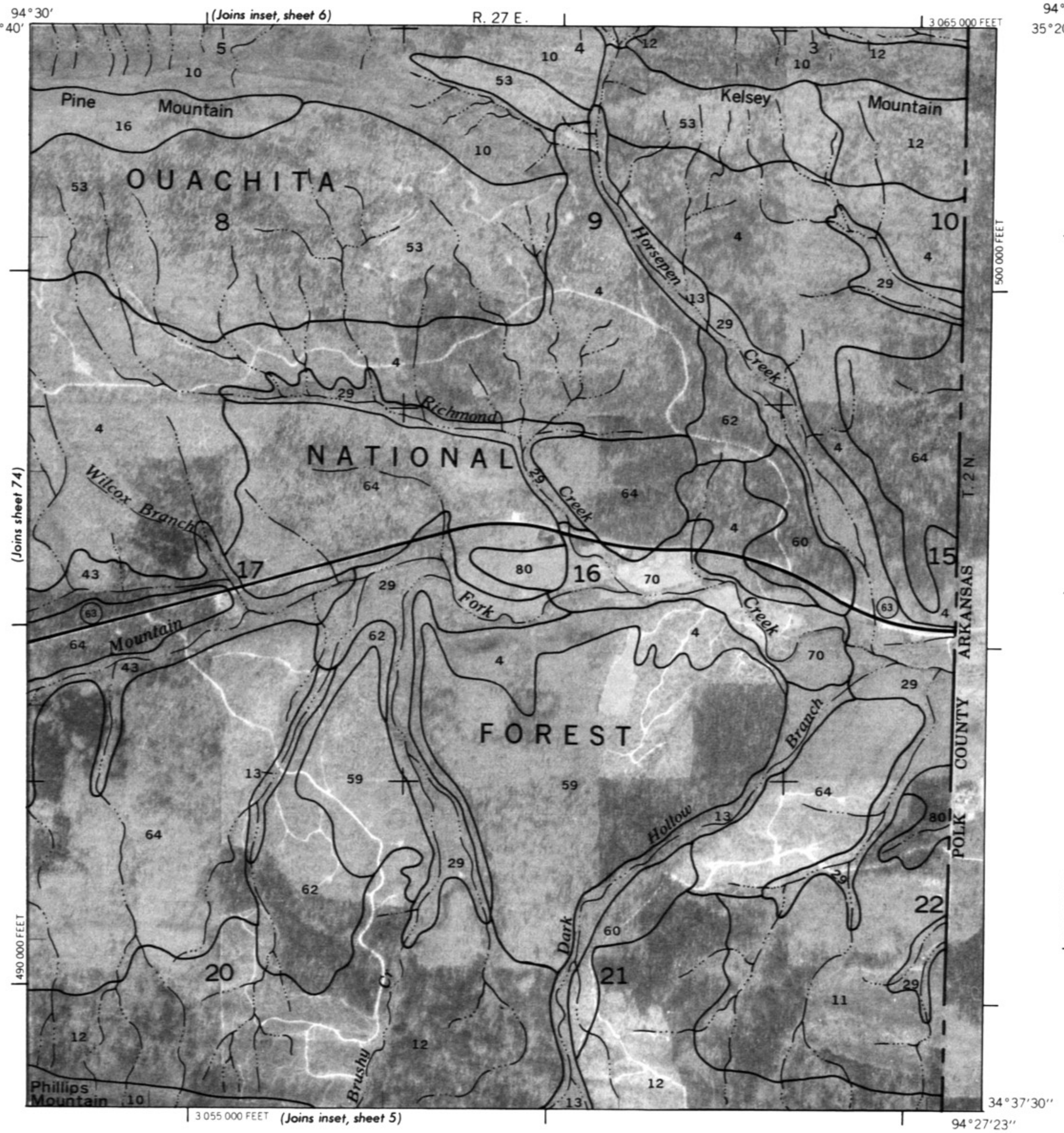
MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Borrow Pit


N
R. 26 E.
R. 27 E.
3 045 000 FEET
(Joins inset, sheet 4)
94°26′
35°22′30″
760 000 FEET
T. 10 N.
ARKANSAS RIVER
SEQUOYAH COUNTY
water
POTEAU RIVER
ARKOMA
ARKANSAS
SEBASTIAN COUNTY
750 000 FEET
Peno Corner
35°20′
94°30′
(Joins sheet 5)
3 060 000 FEET
3 055 000 FEET
R. 27 E.
(Joins inset, sheet 5)
94°27′23″
34°35′
Beech Cr.
Walnut Mountain
470 000 FEET
Cow Creek
MOUNTAIN
T. 1 N.
OUACHITA NATIONAL FOREST
COW CREEK
Little Cow Mountain
(Joins sheet 80)
ARKANSAS
POLK COUNTY
460 000 FEET
34°32′30″
94°30′
(Joins inset, sheet 81)
3 065 000 FEET
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

2

N

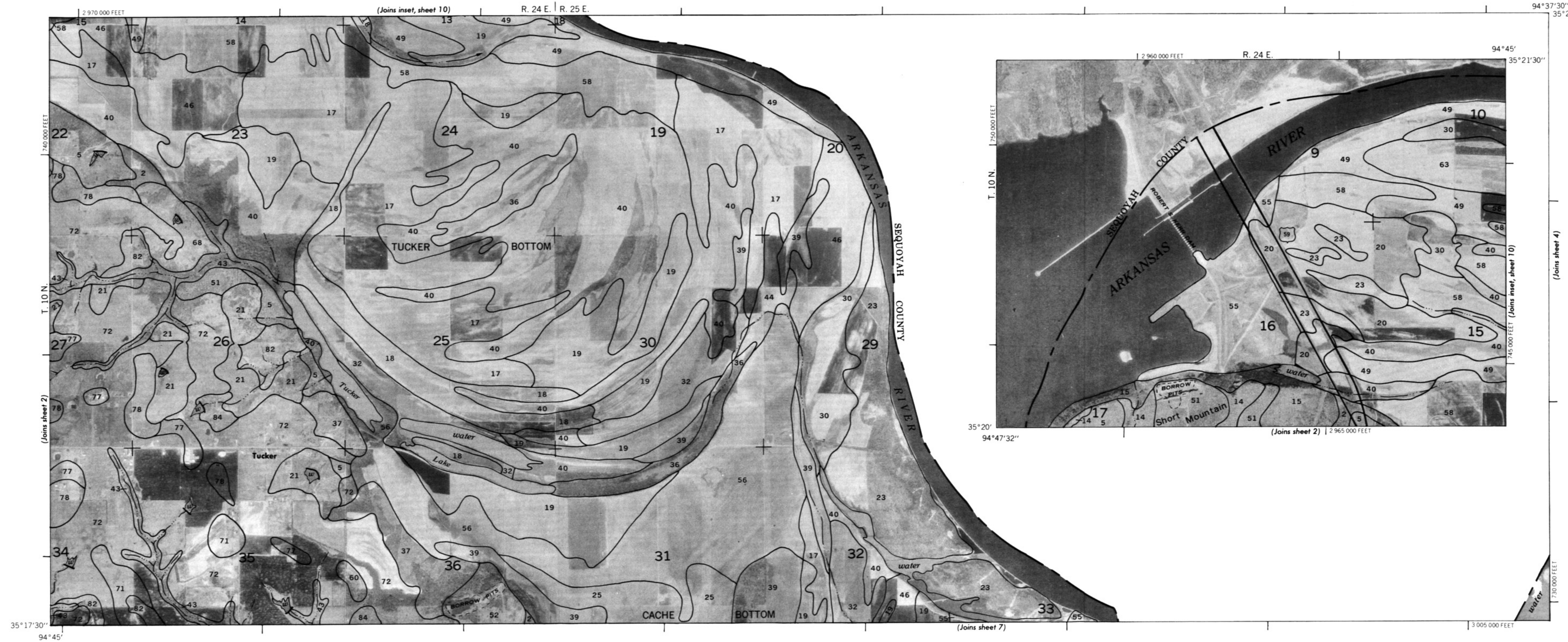


5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

Scale - 1:24000

N



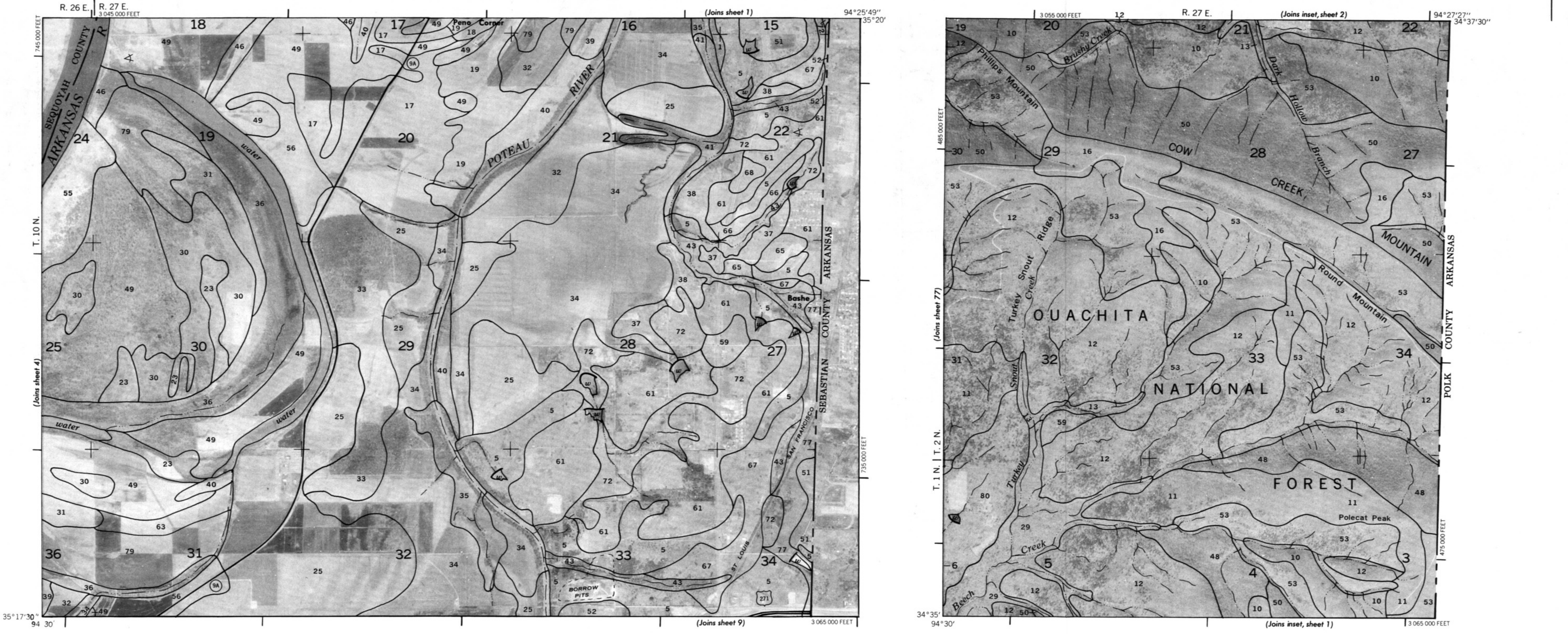
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

1 .5 0 1 2 3 Kilometers

Scale - 1:24 000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 4

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 5



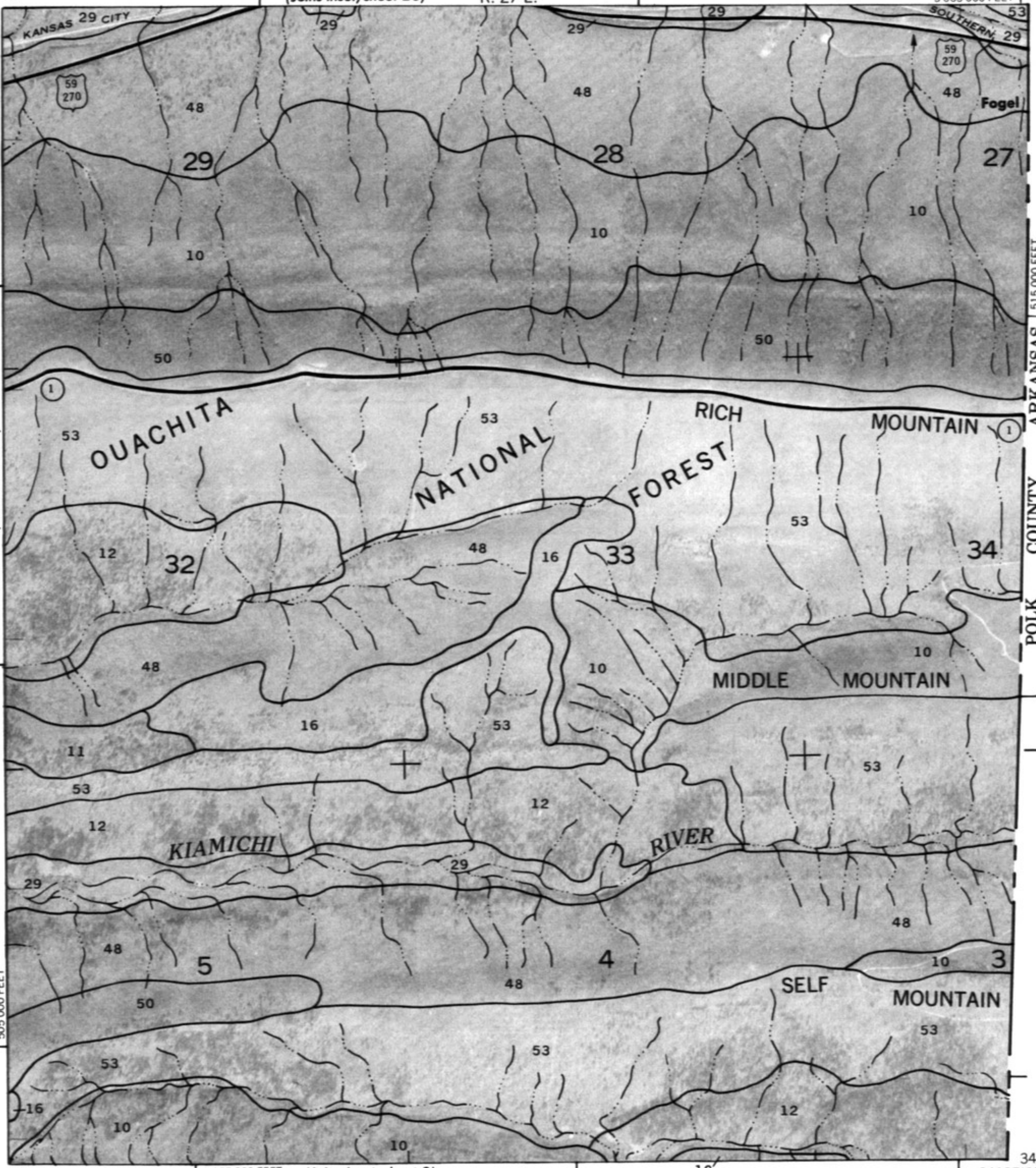
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

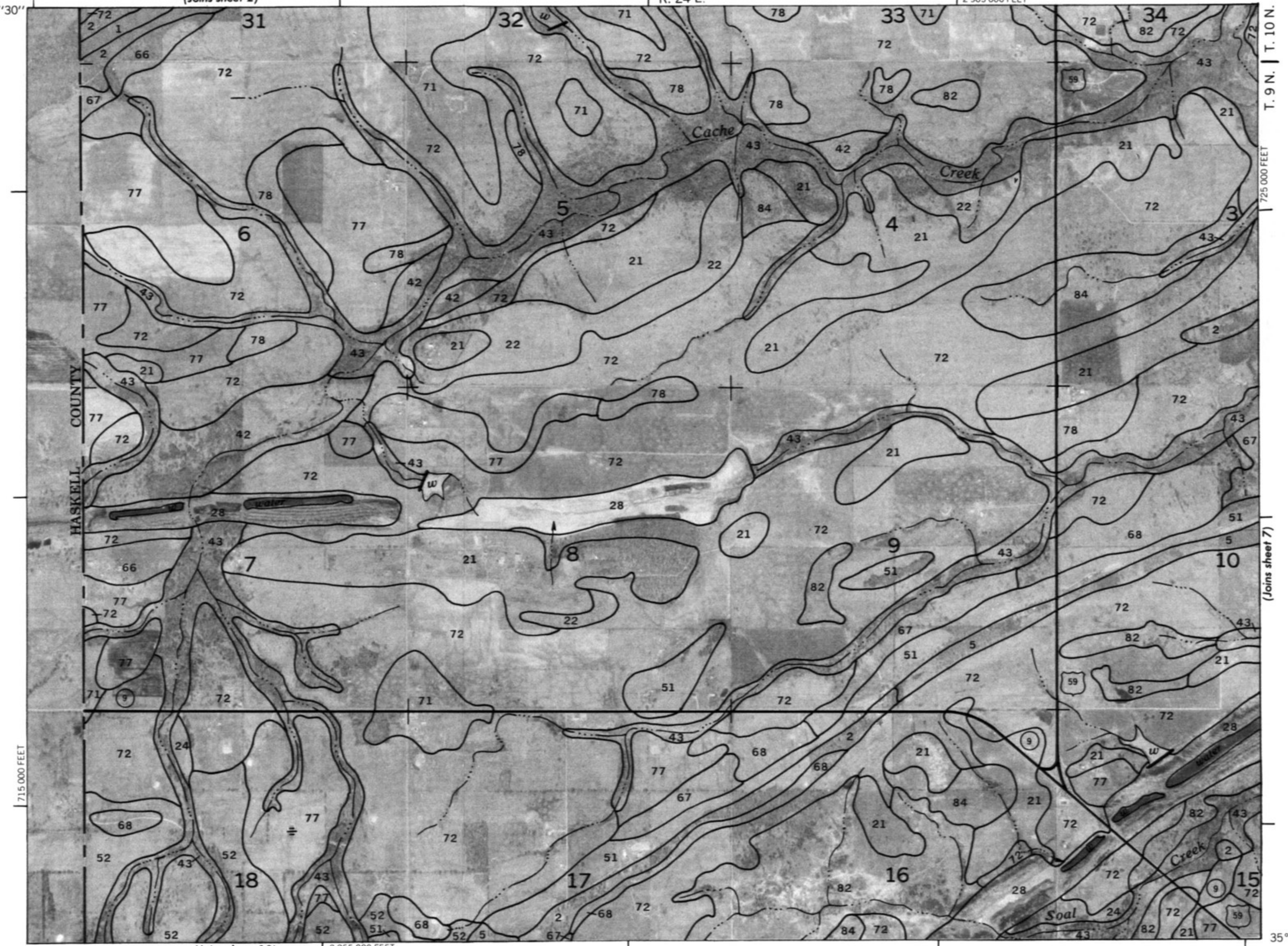
1 .5 0 1 2 3 Kilometers

Scale - 1:24 000

N

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 6

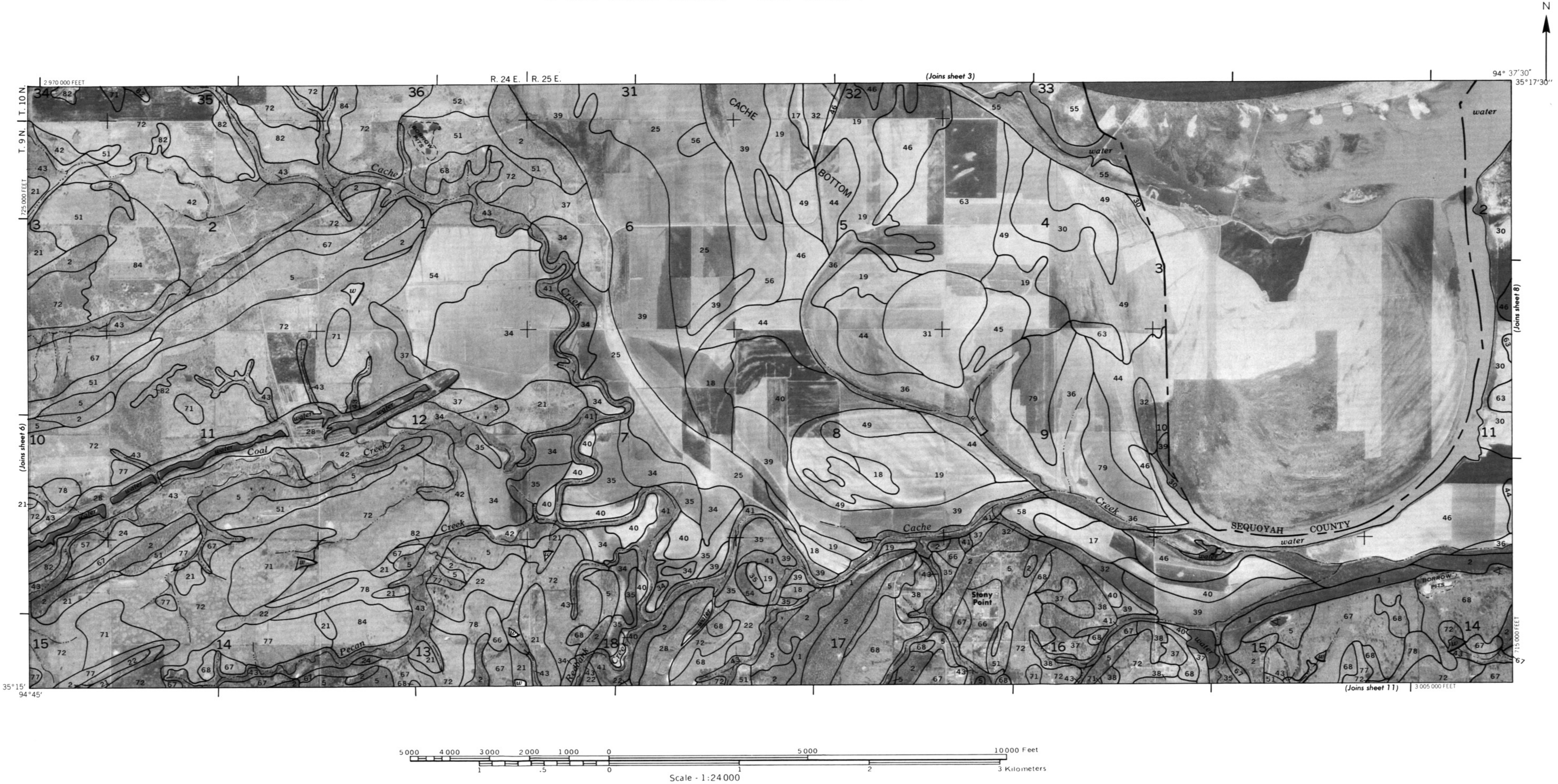


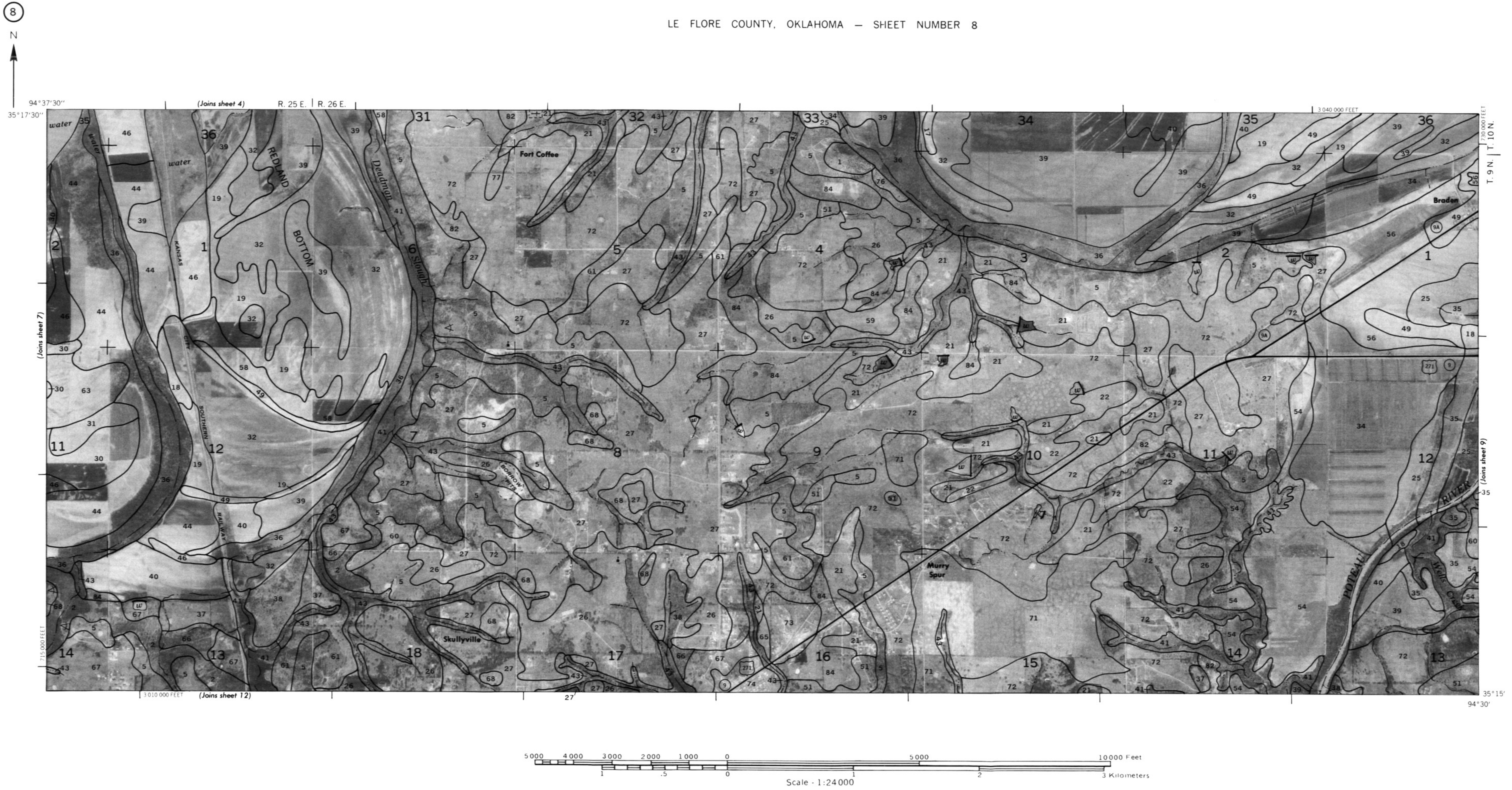


5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

Scale - 1:24 000

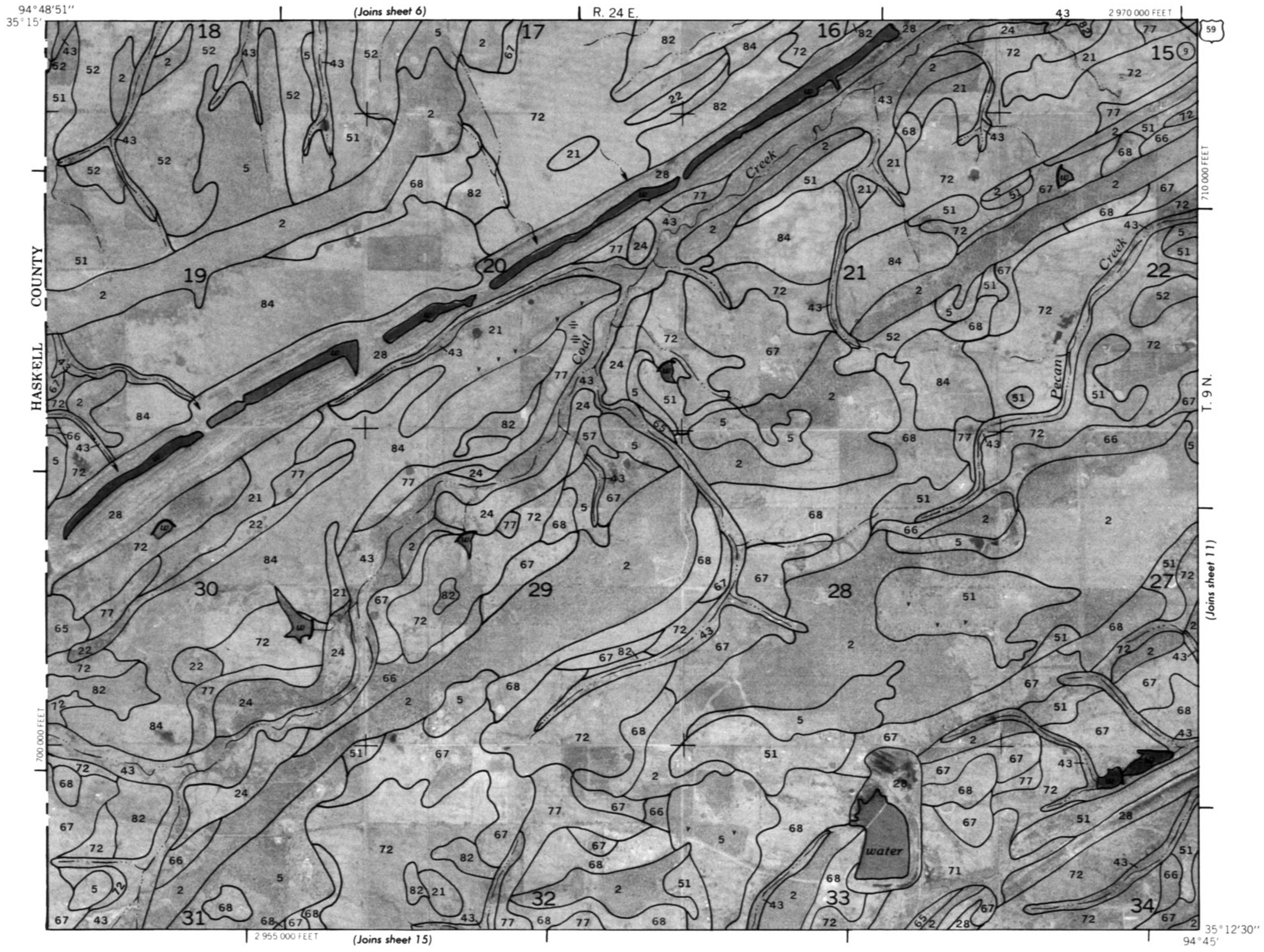

N
(Joins sheet 3)
R. 24 E. | R. 25 E.
T. 10 N.
T. 9 N.
2 970 000 FEET
725 000 FEET
94° 37′30″
35°17′30″
(Joins sheet 6)
(Joins sheet 8)
(Joins sheet 11)
3 005 000 FEET
715 000 FEET
35°15′
94°45′
Cache
Creek
CACHE
BOTTOM
Coal
Creek
Pecan
Redbank
Creek
Cache
Creek
water
SEQUOYAH COUNTY
Stony Point
BORROW PITS
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000


N
94°37'30"
35°17'30"
(Joins sheet 4)
R. 25 E. | R. 26 E.
(Joins sheet 7)
(Joins sheet 9)
(Joins sheet 12)
T. 9 N. | T. 10 N.
Fort Coffee
Braden
Murry Spur
Skullyville
REDLAND BOTTOM
Deadman Slough
KANSAS CITY SOUTHERN RAILWAY
POTEAU RIVER
BORROW PITS
water
3 040 000 FEET
730 000 FEET
715 000 FEET
3 010 000 FEET
35°15'
94°30'
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000


N
R. 26 E. | R. 27 E.
3 045 000 FEET
T. 10 N.
T. 9 N.
130 000 FEET
(Joins sheet 5)
94°26′11″
35°17′30″
Braden
POTEAU
RIVER
Cedars
ST. LOUIS
SAN FRANCISCO
Cedar
Creek
Wells
Creek
ARKANSAS
COUNTY
SEBASTIAN
(Joins sheet 8)
720 000 FEET
35°15′
94°30′
(Joins sheet 13)
3 060 000 FEET
3 050 000 FEET
R. 27 E.
(Joins inset, sheet 43)
94°26′48″
34°55′
590 000 FEET
T. 5 N.
(Joins sheet 51)
Line
Creek
BOUNDARY
FOREST
NATIONAL
ARKANSAS
COUNTY
SCOTT
KANSAS
CITY
SOUTHERN
RAILWAY
Hiawatha
Sugar
Creek
Sugar Creek
Line
Creek
POTEAU
RIVER
580 000 FEET
34°52′30″
94°30′
(Joins inset, sheet 13)
3 060 000 FEET
5 000
4 000
3 000
2 000
1 000
0
5 000
10 000 Feet
1
.5
0
1
2
3 Kilometers
Scale - 1:24 000

N

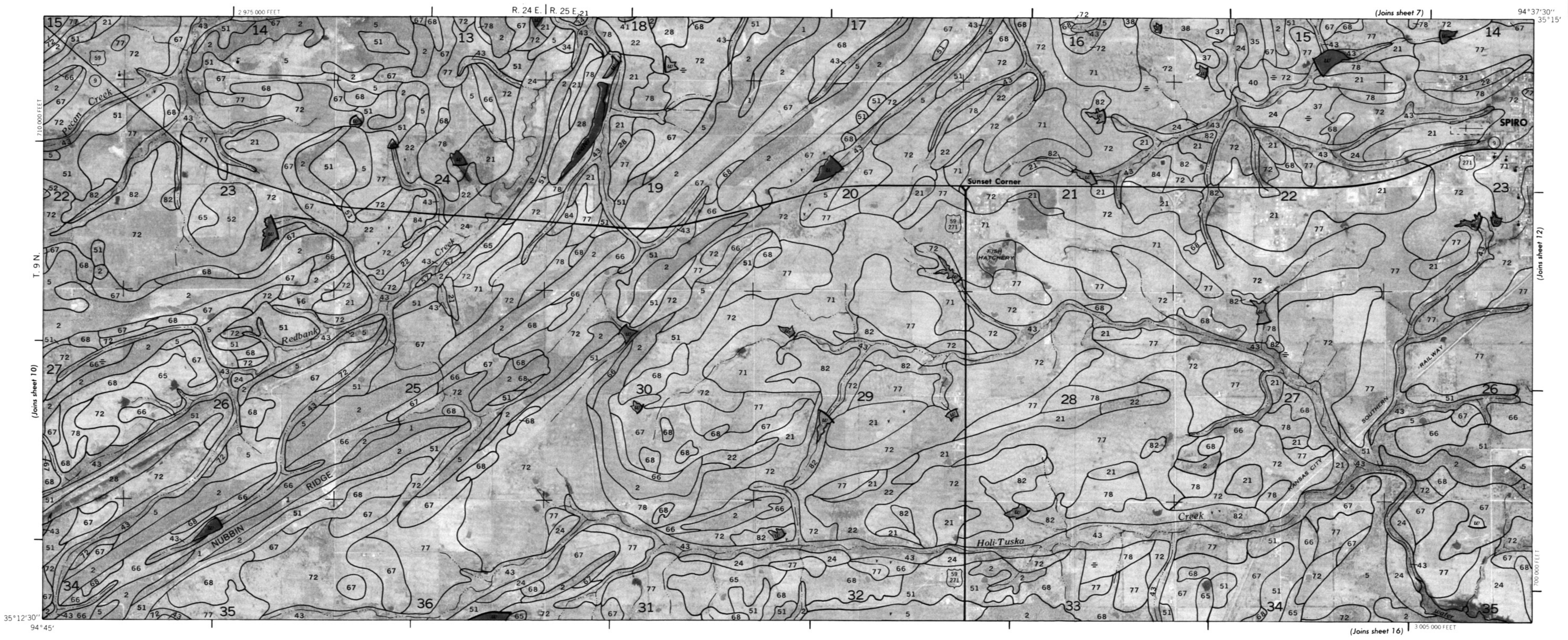
LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 10



5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

1 .5 0 1 2 3 Kilometers

Scale - 1:24 000



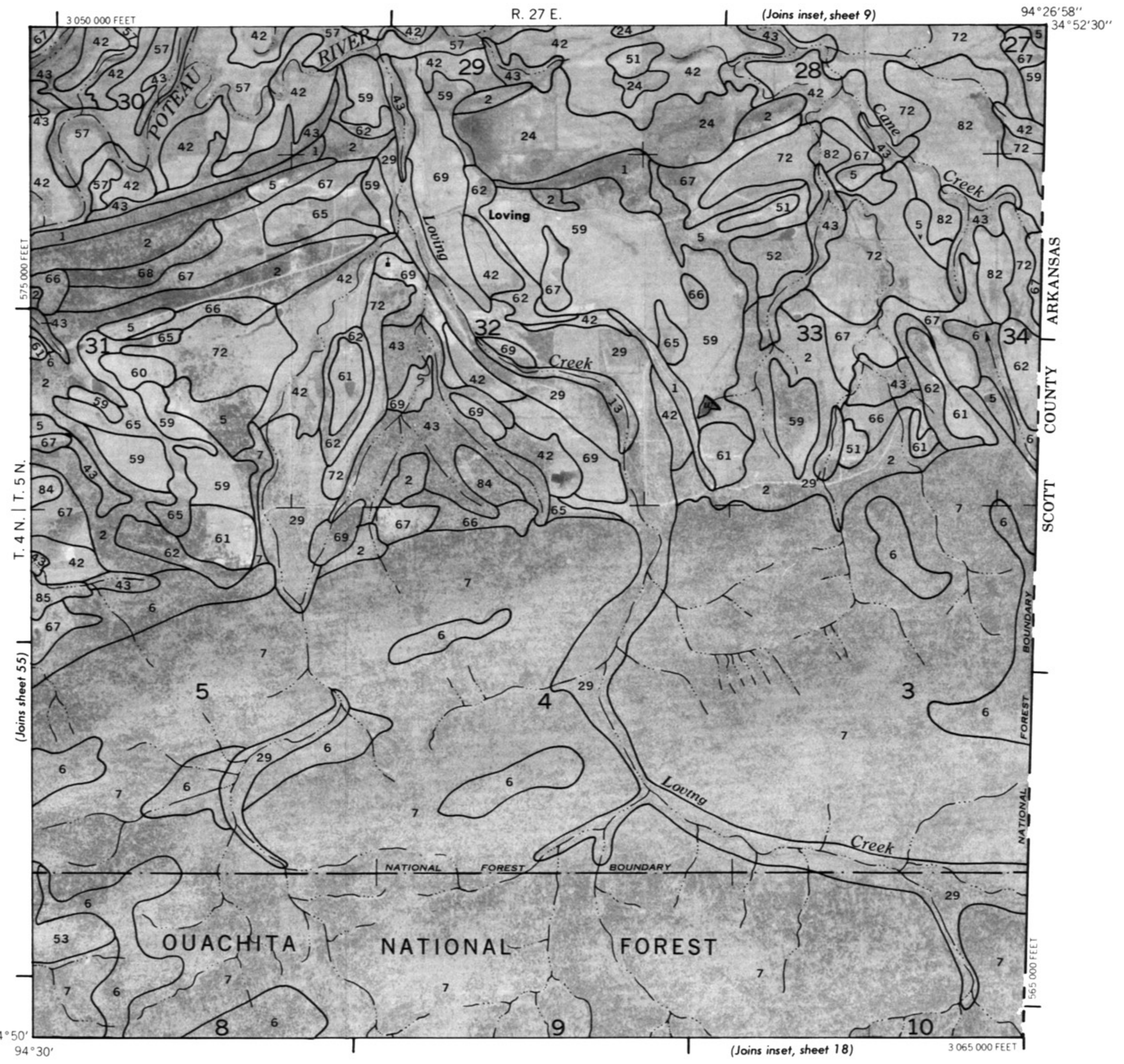
5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

Scale - 1:24 000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 12

N

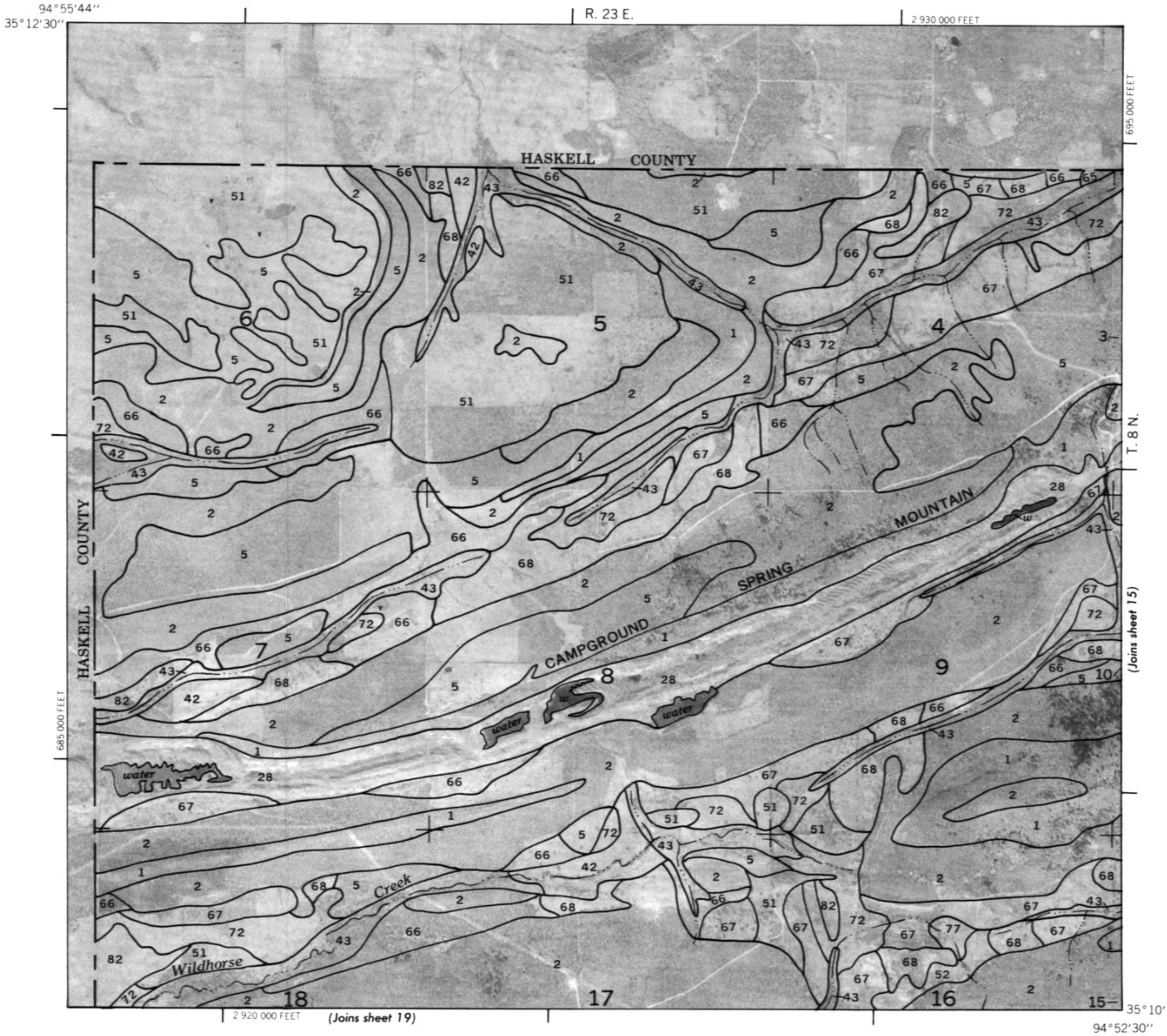


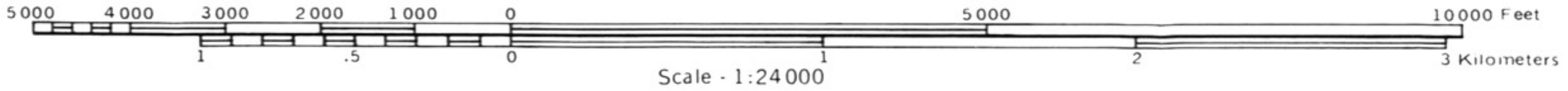
5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

Scale - 1:24000

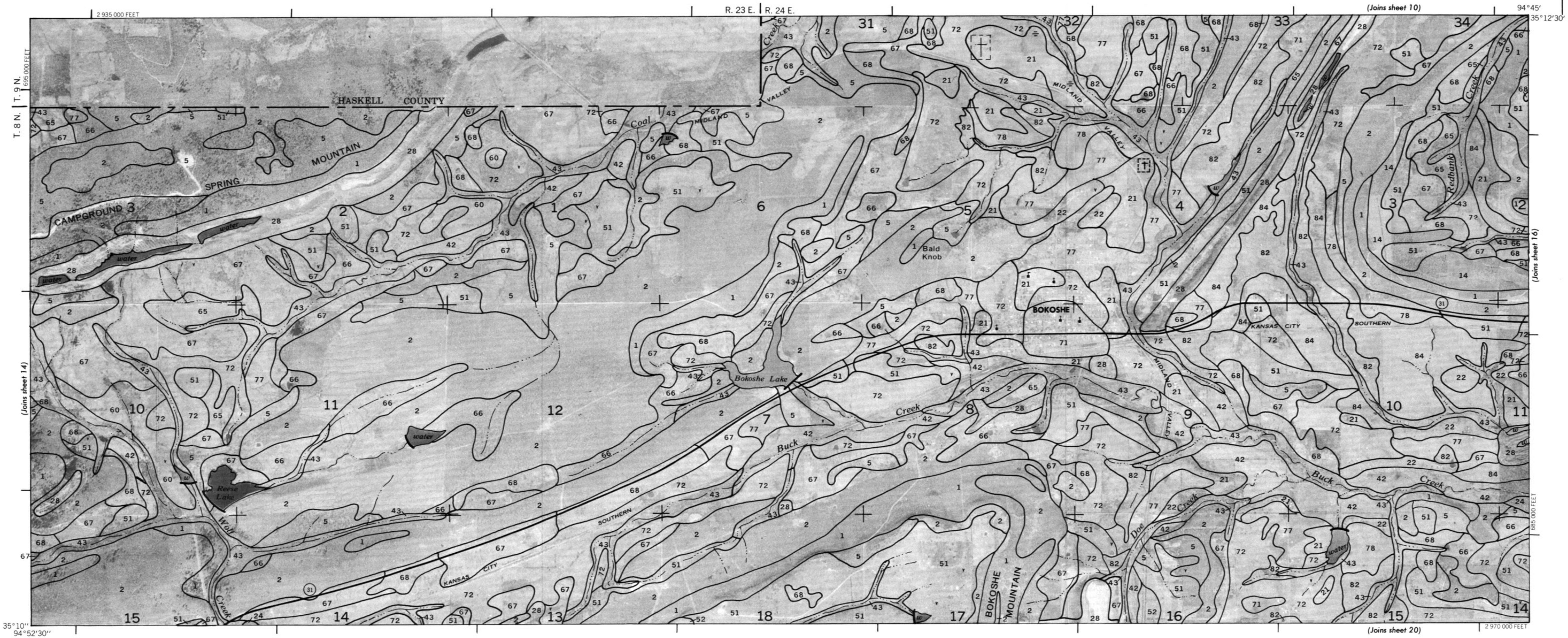
LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 14





15

N

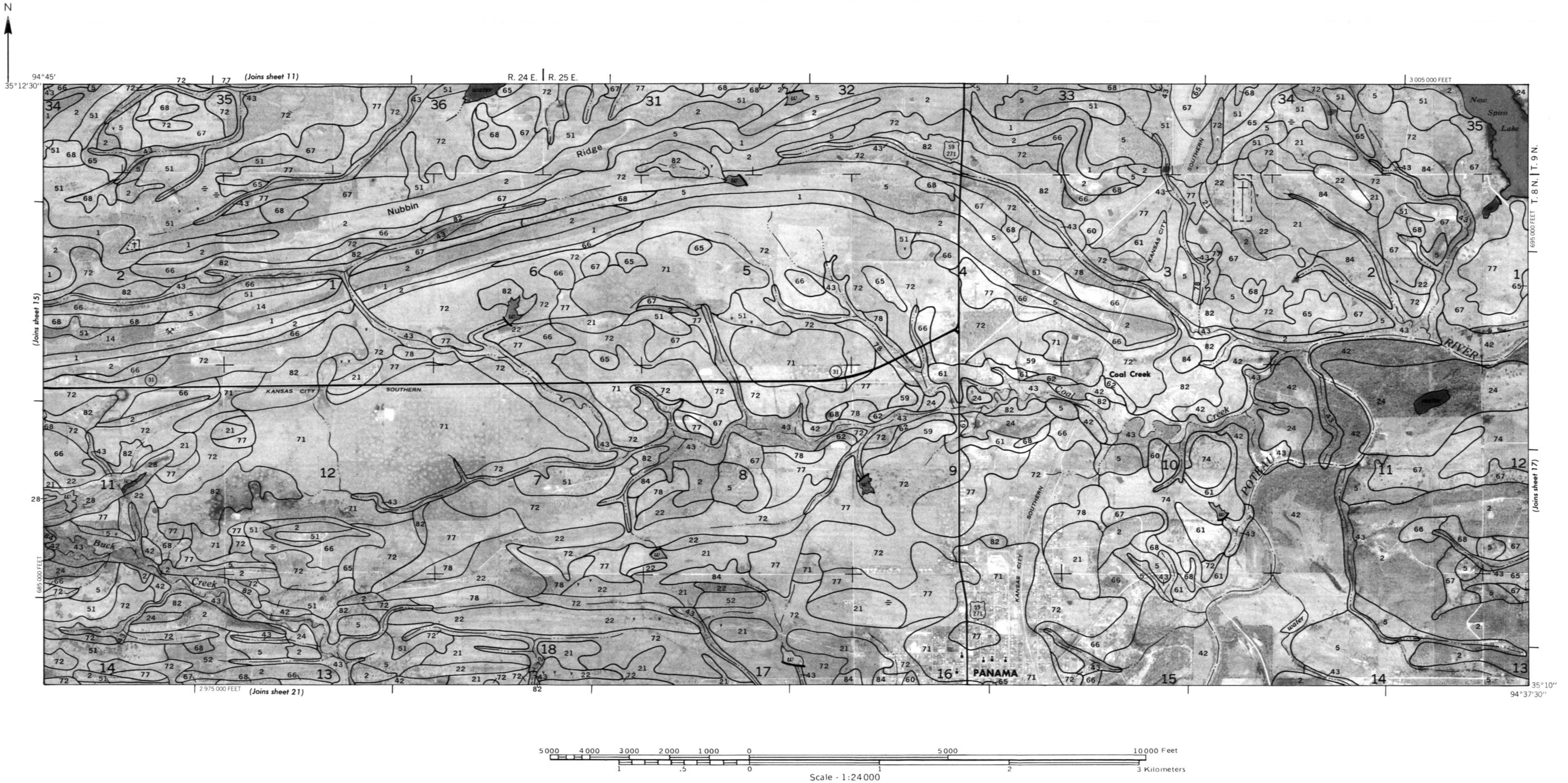


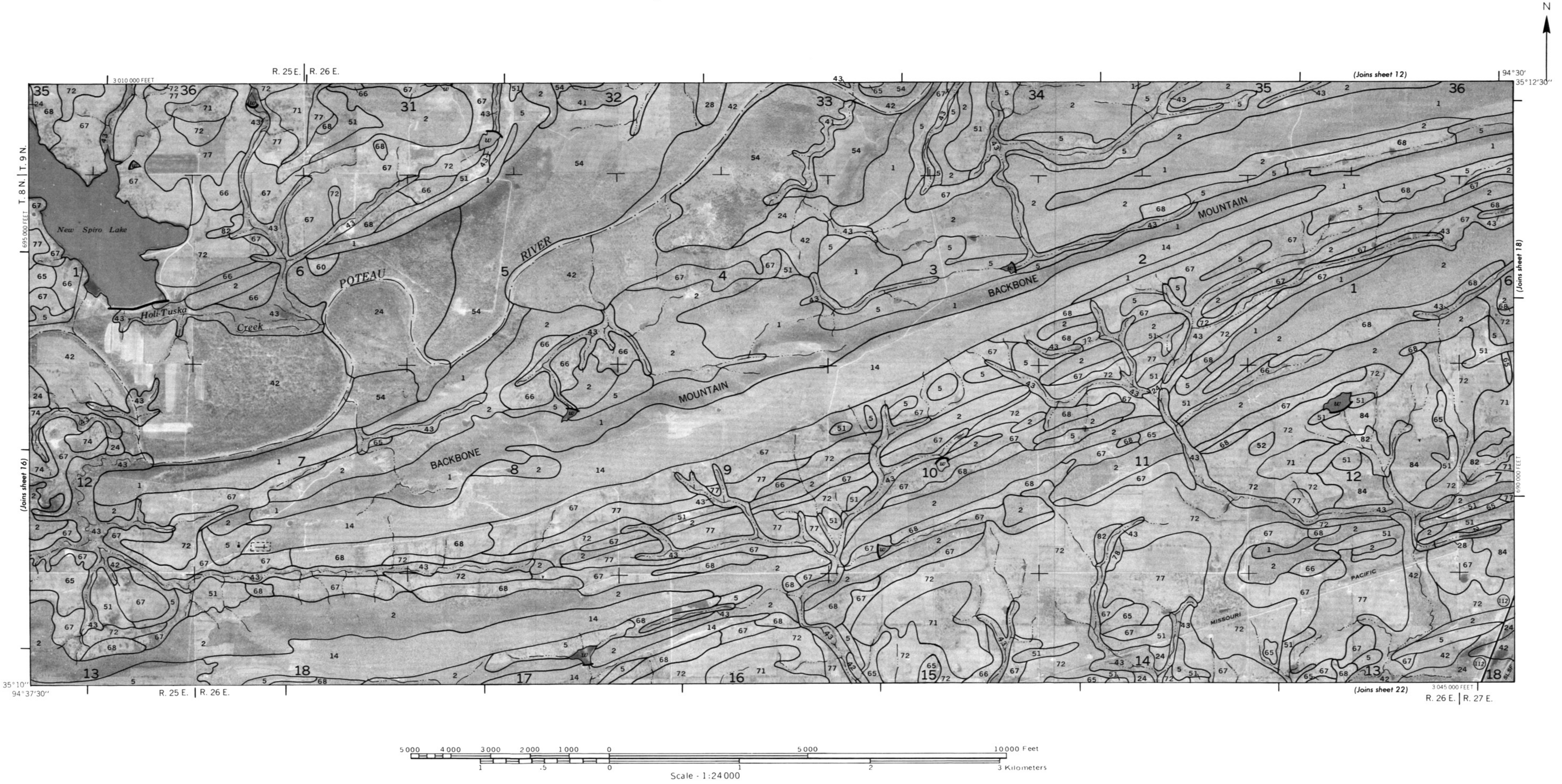
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

1 .5 0 1 2 3 Kilometers

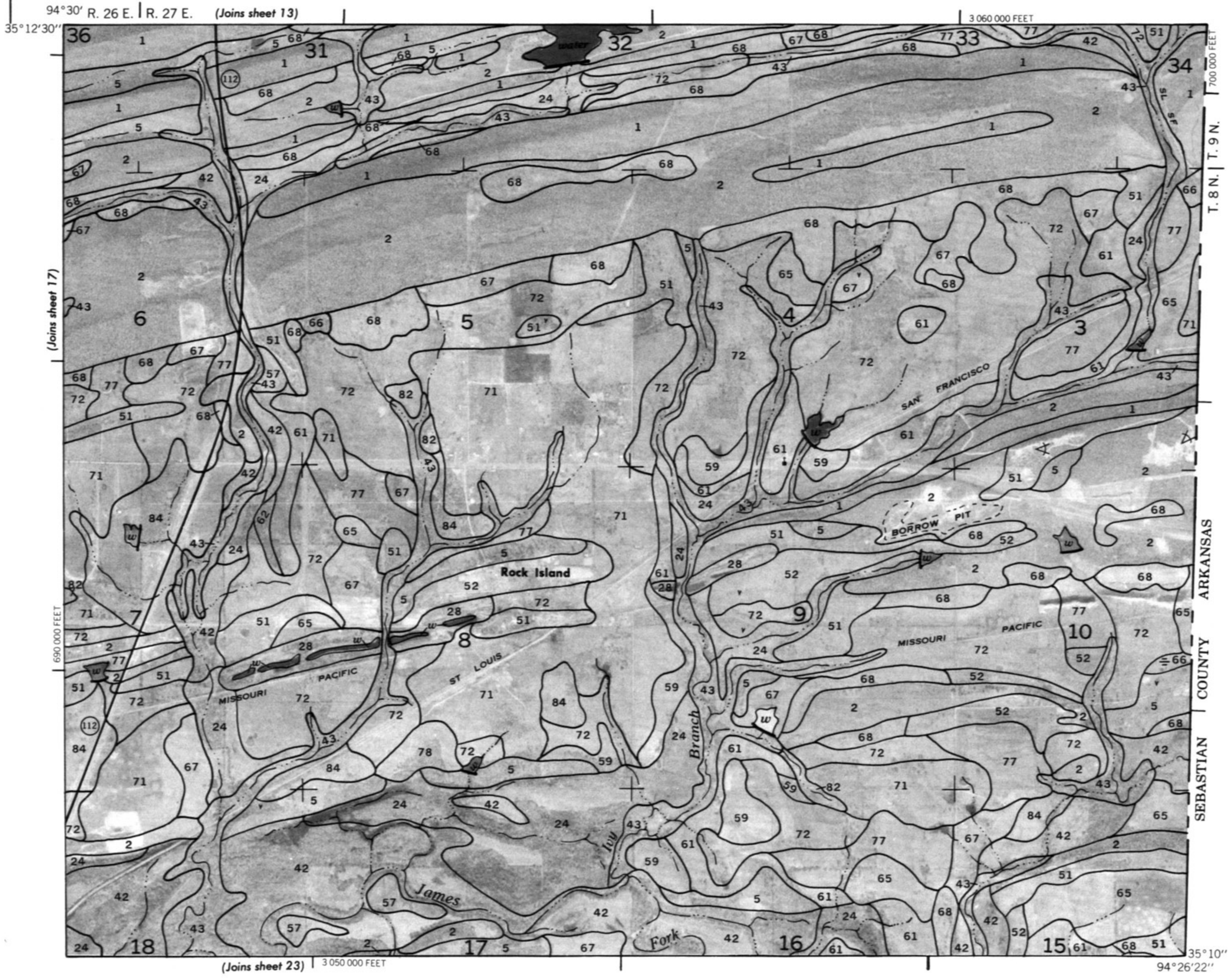
Scale - 1:24 000

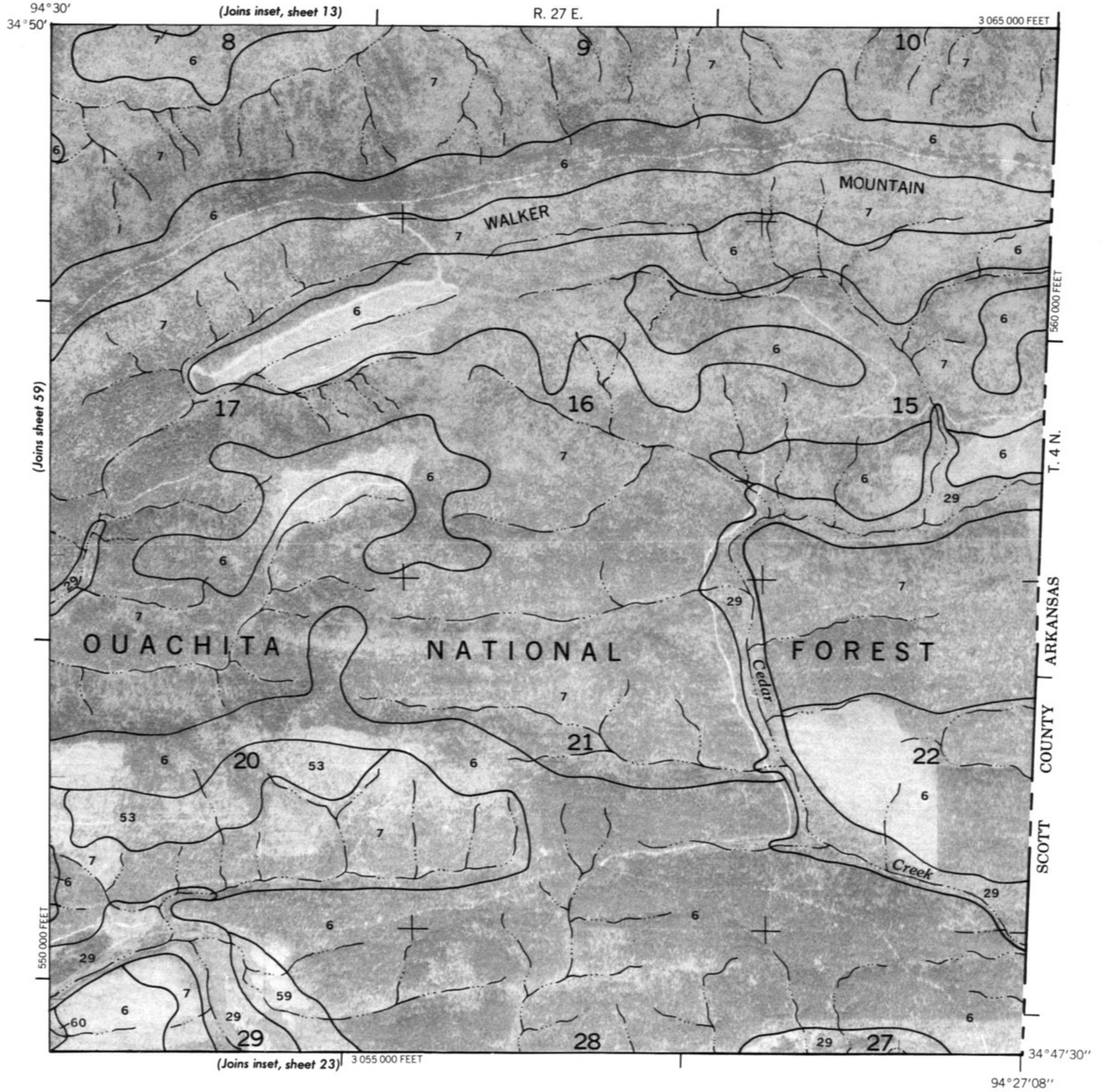
LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 16




N
R. 25 E. | R. 26 E.
3 010 000 FEET
(Joins sheet 12)
94°30′
35°12′30″
T. 8 N. | T. 9 N.
695 000 FEET
New Spiro Lake
Holi-Tuska
Creek
POTEAU
RIVER
BACKBONE
MOUNTAIN
MOUNTAIN
BACKBONE
(Joins sheet 16)
(Joins sheet 18)
690 000 FEET
MISSOURI
PACIFIC
35°10′
94°37′30″
R. 25 E. | R. 26 E.
(Joins sheet 22)
3 045 000 FEET
R. 26 E. | R. 27 E.
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

N

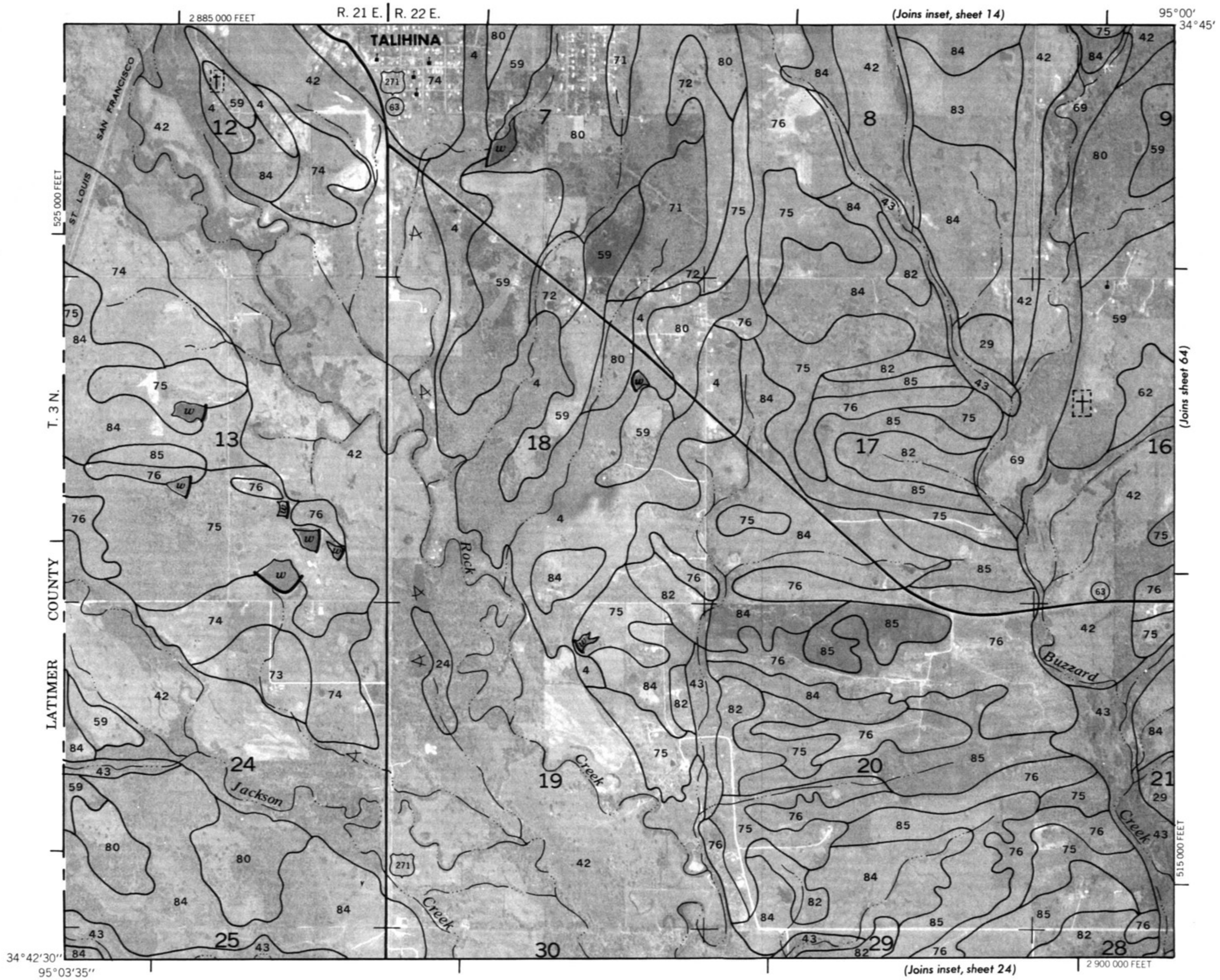


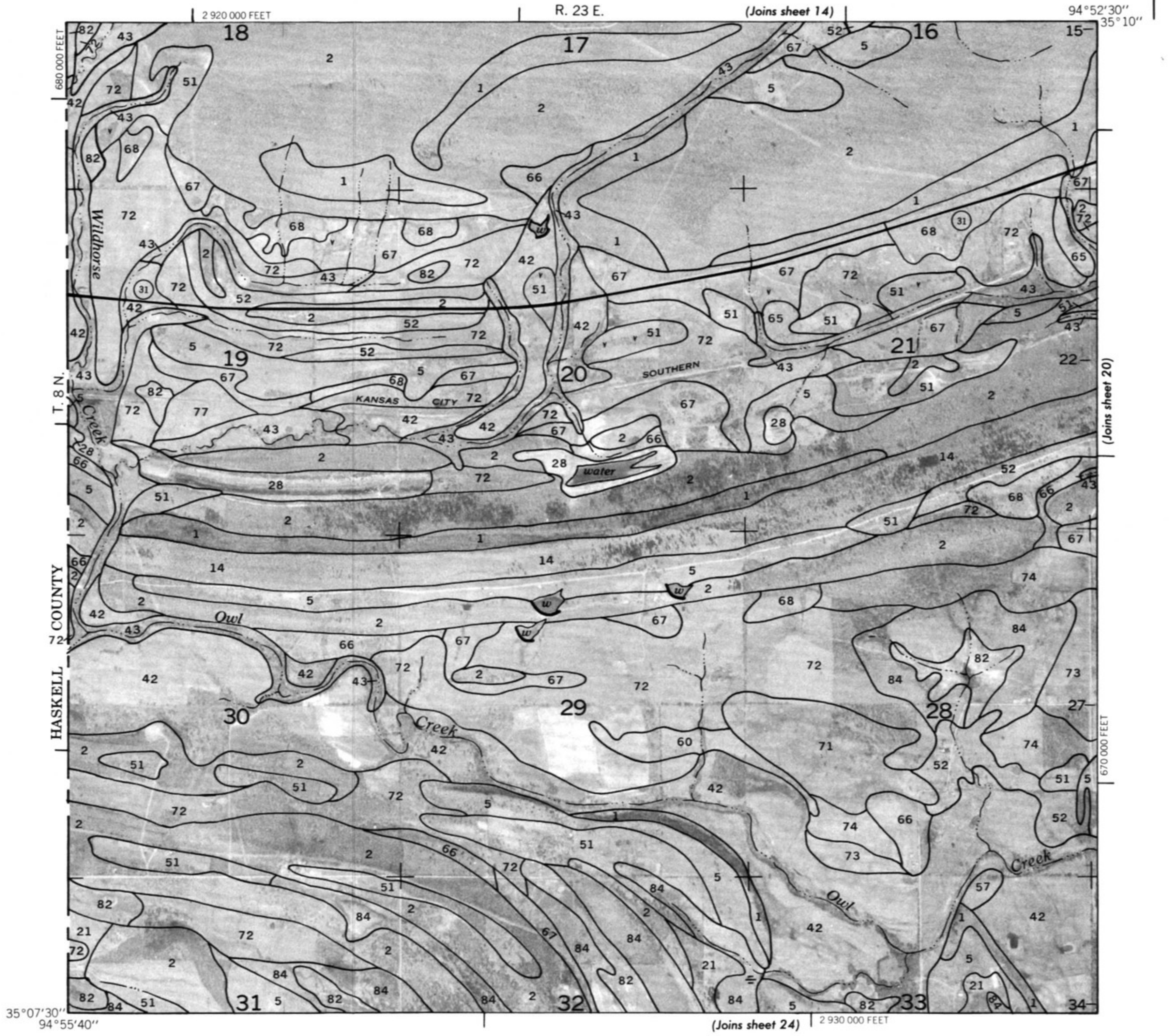


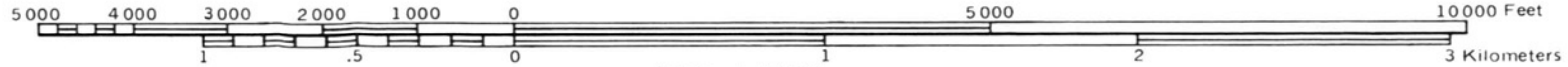
5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

Scale - 1:24000



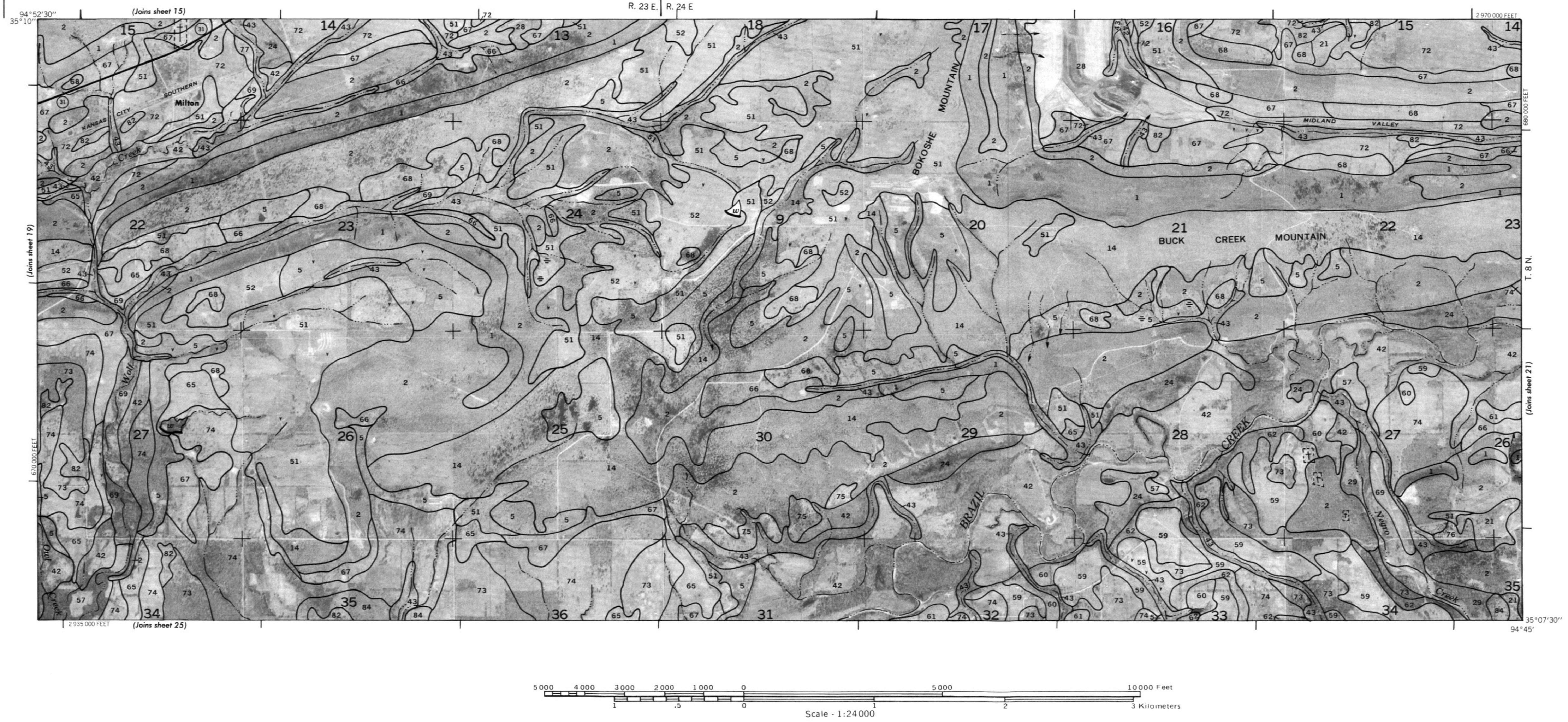


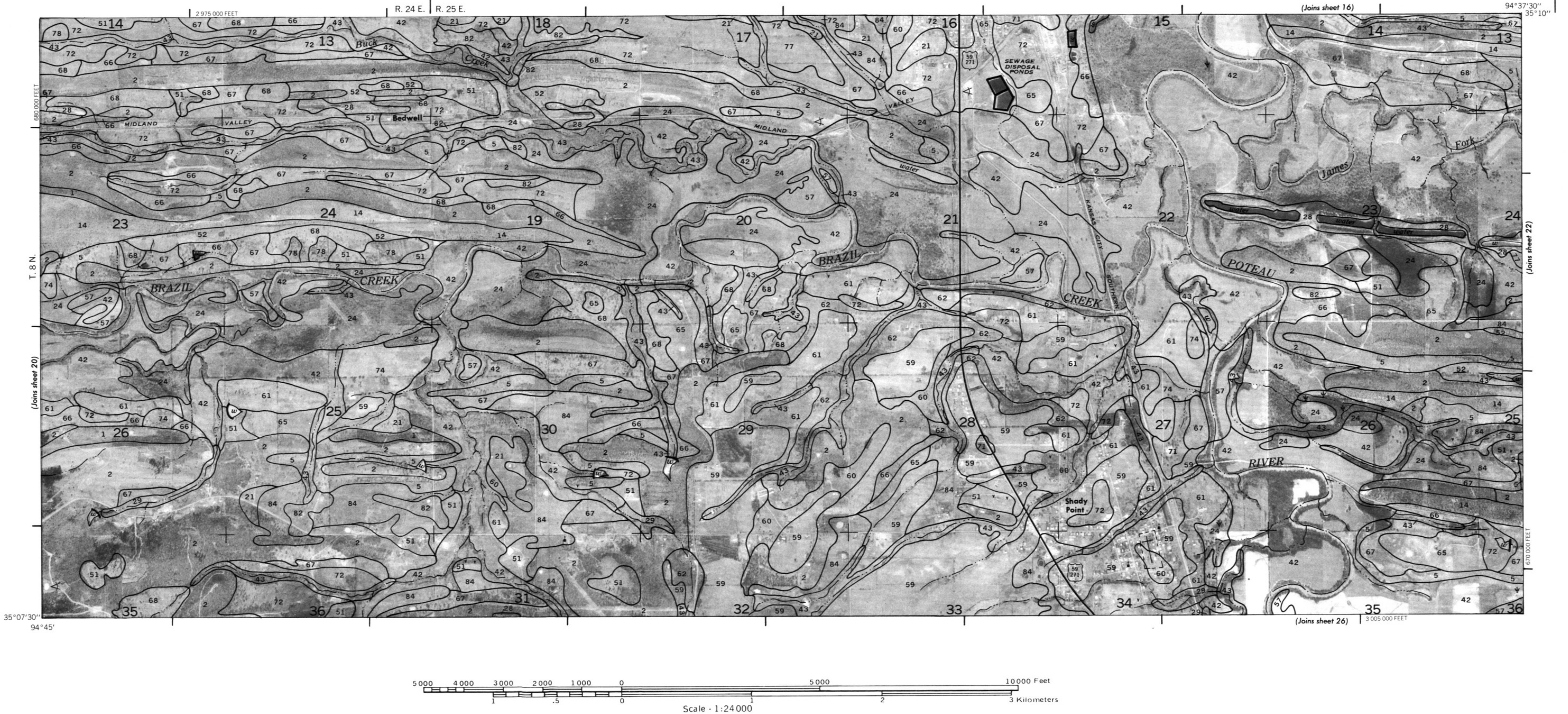


Scale - 1:24 000

20

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 20





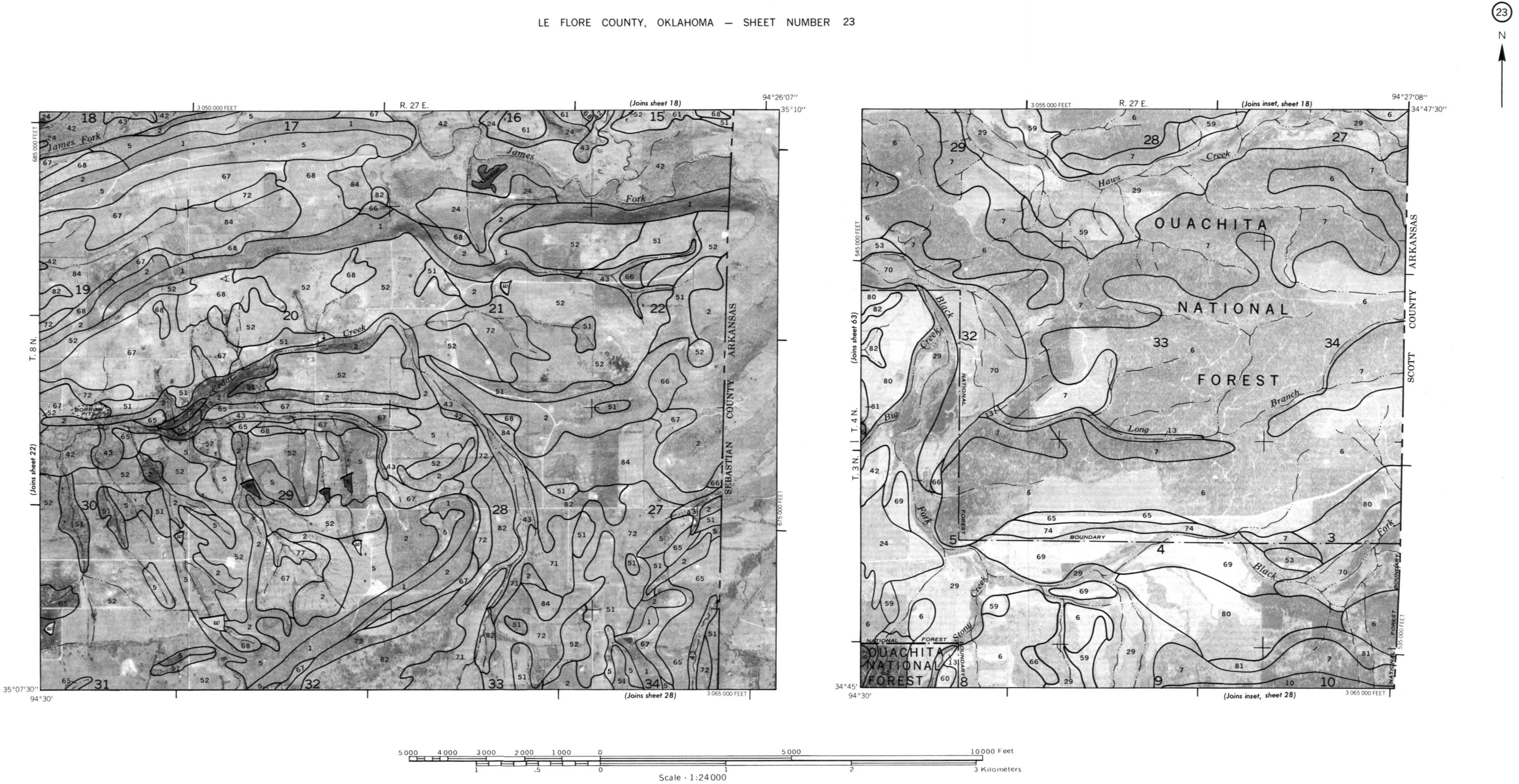
Scale - 1:24 000

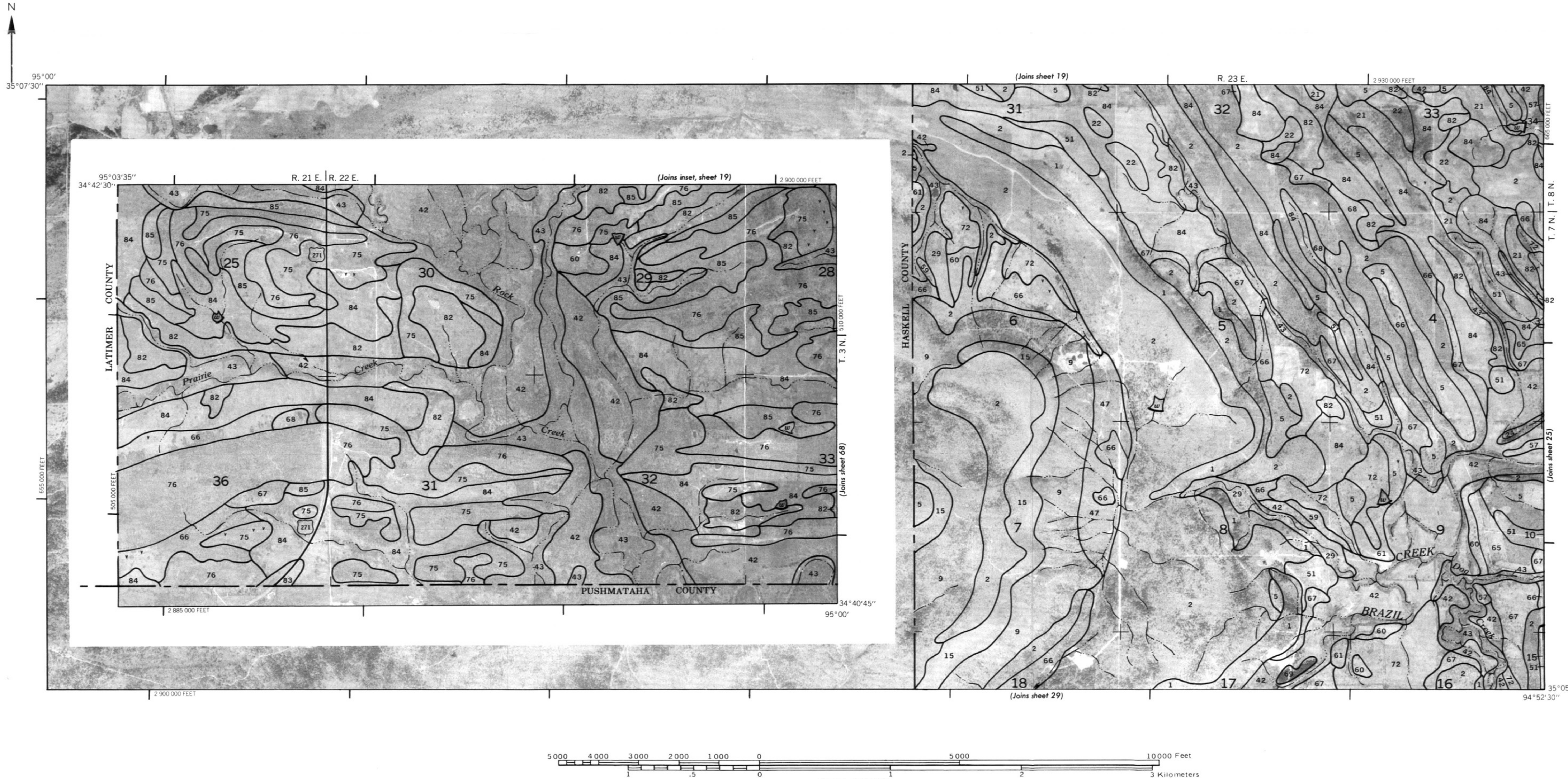
LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 22

5000 4000 3000 2000 1000 0 5000 10000 Feet

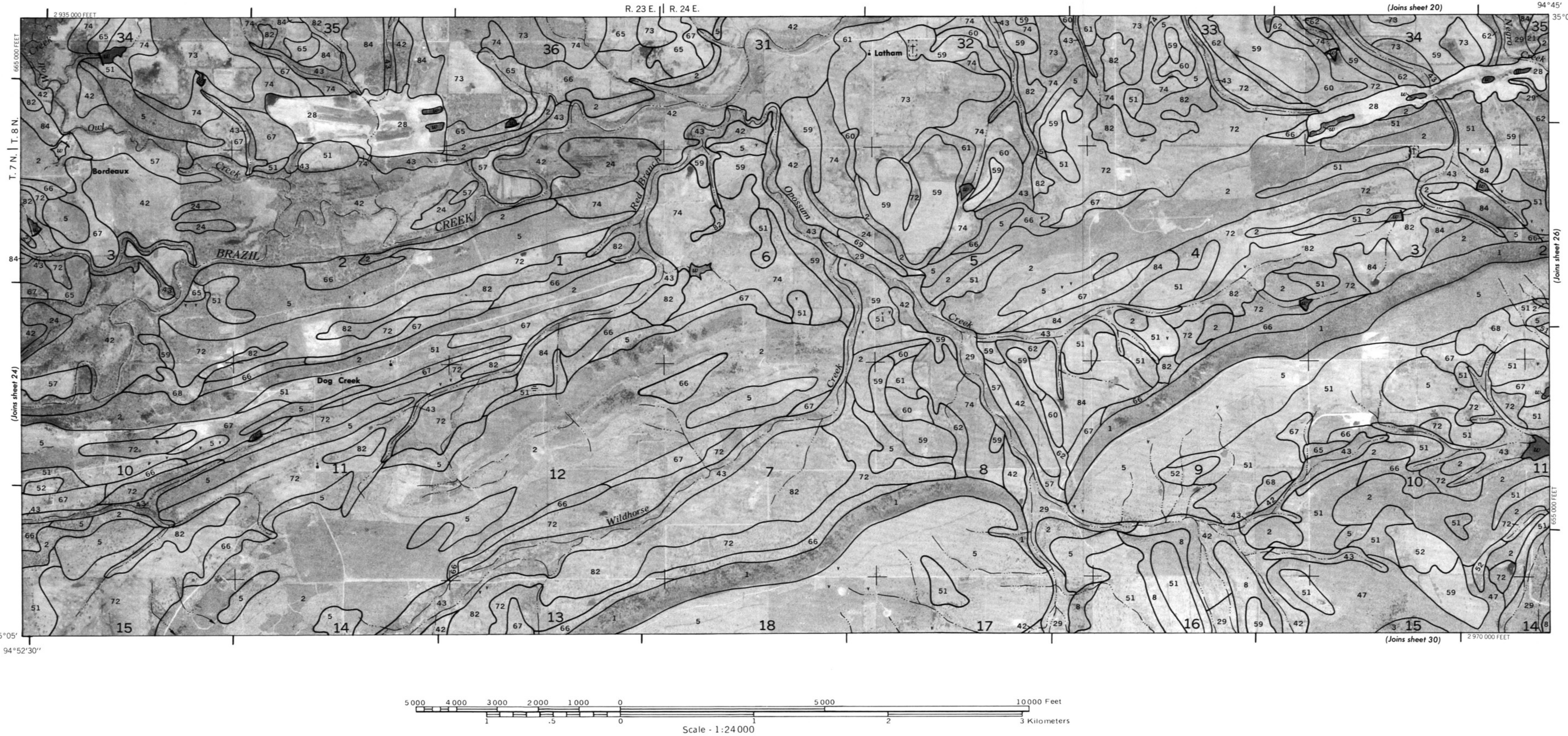
1 .5 0 1 2 3 Kilometers

Scale - 1:24000

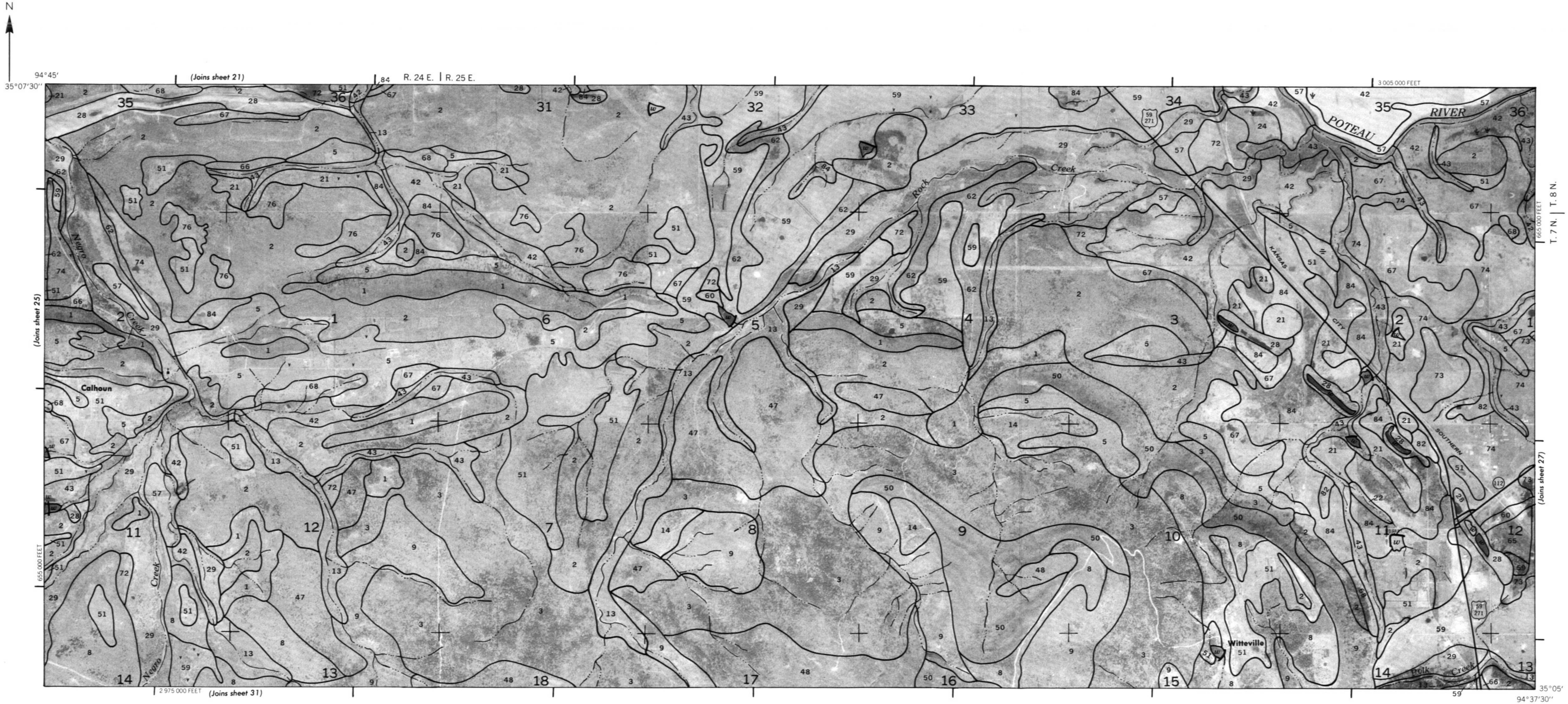

23
N
(Joins sheet 18)
R. 27 E.
T. 8 N.
(Joins sheet 22)
(Joins sheet 28)
James Fork
Cedar Creek
SEBASTIAN COUNTY ARKANSAS
(Joins inset, sheet 18)
(Joins sheet 63)
T. 4 N.
T. 3 N.
OUACHITA NATIONAL FOREST
Haws Creek
Black Creek
Black Fork
Long Branch
Stony Creek
Big Creek
SCOTT COUNTY ARKANSAS
NATIONAL FOREST BOUNDARY
(Joins inset, sheet 28)
35°10″
35°07′30″
94°30′
94°26′07″
94°27′08″
34°47′30″
34°45′
3 050 000 FEET
3 055 000 FEET
3 065 000 FEET
685 000 FEET
675 000 FEET
545 000 FEET
535 000 FEET
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000



Scale - 1:24 000


N
R. 23 E. | R. 24 E.
T. 7 N. | T. 8 N.
94°45′
35°07′30″
35°05′
94°52′30″
2 935 000 FEET
2 970 000 FEET
665 000 FEET
(Joins sheet 20)
(Joins sheet 24)
(Joins sheet 26)
(Joins sheet 30)
Bordeaux
Latham
Dog Creek
Owl Creek
BRAZIL CREEK
Red Branch
Opossum Creek
Wildhorse
Negro Creek
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 26

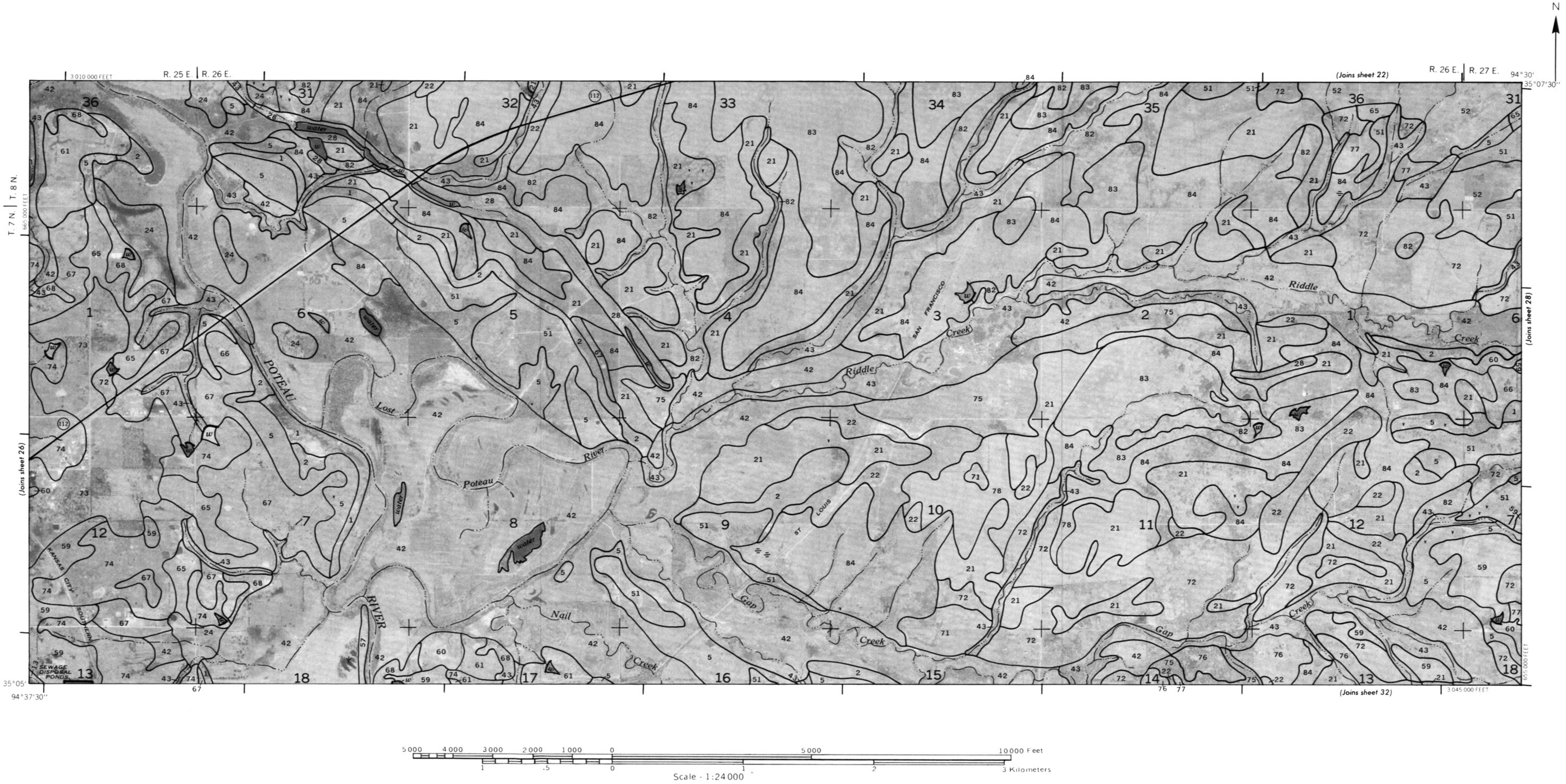


5000 4000 3000 2000 1000 0 5000 10000 Feet

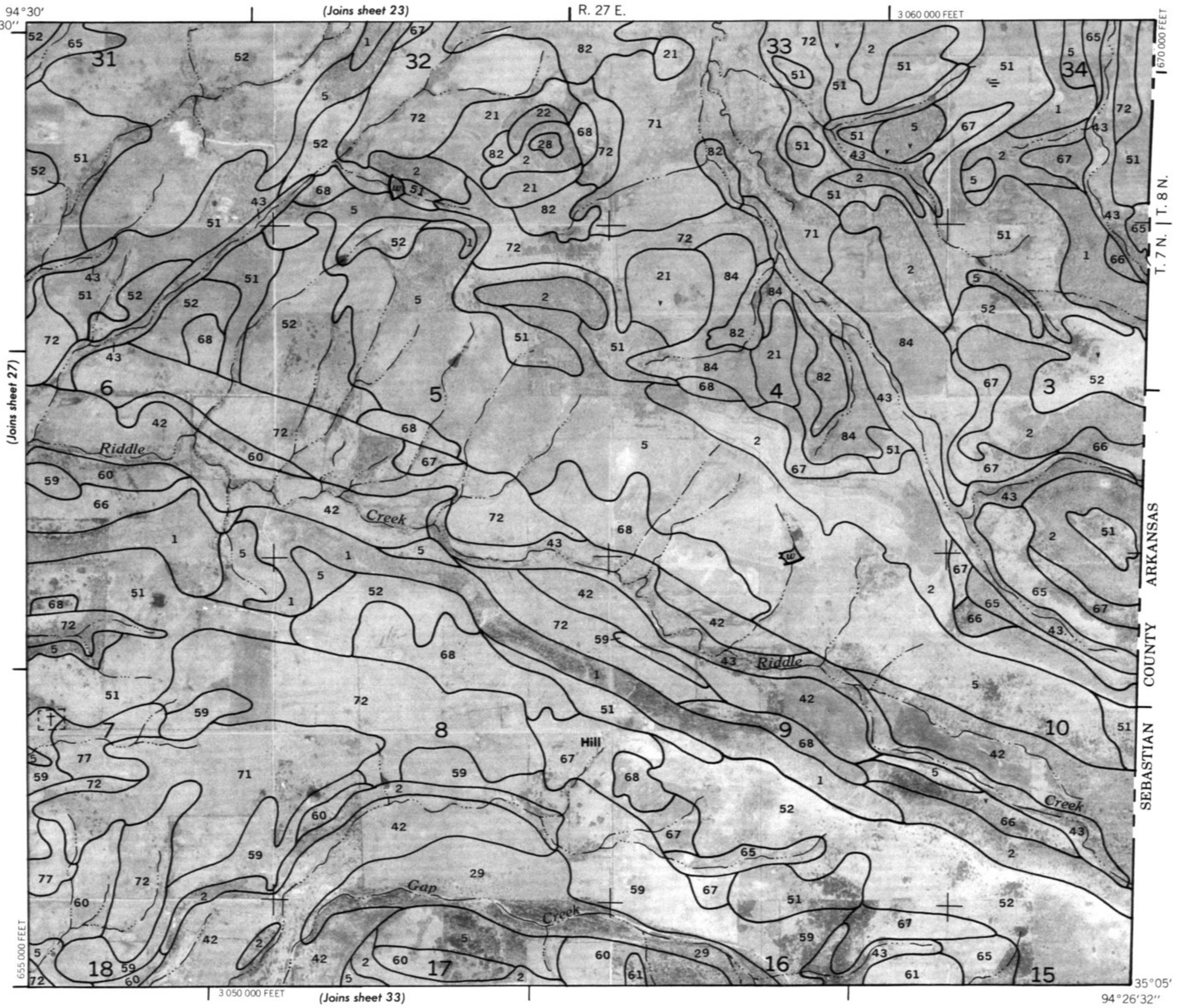
1 .5 0 1 2 3 Kilometers

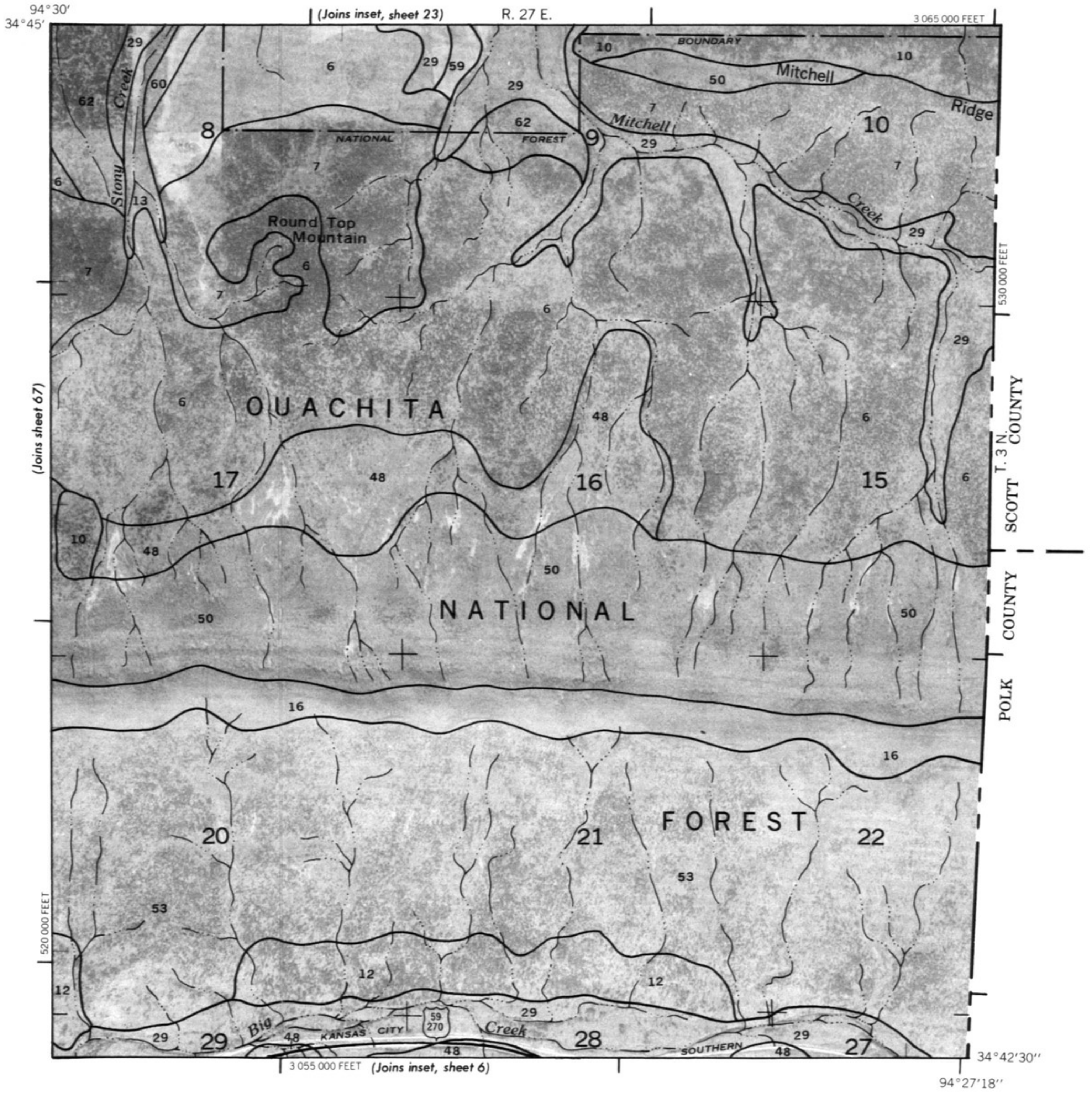
Scale - 1:24000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 27



N



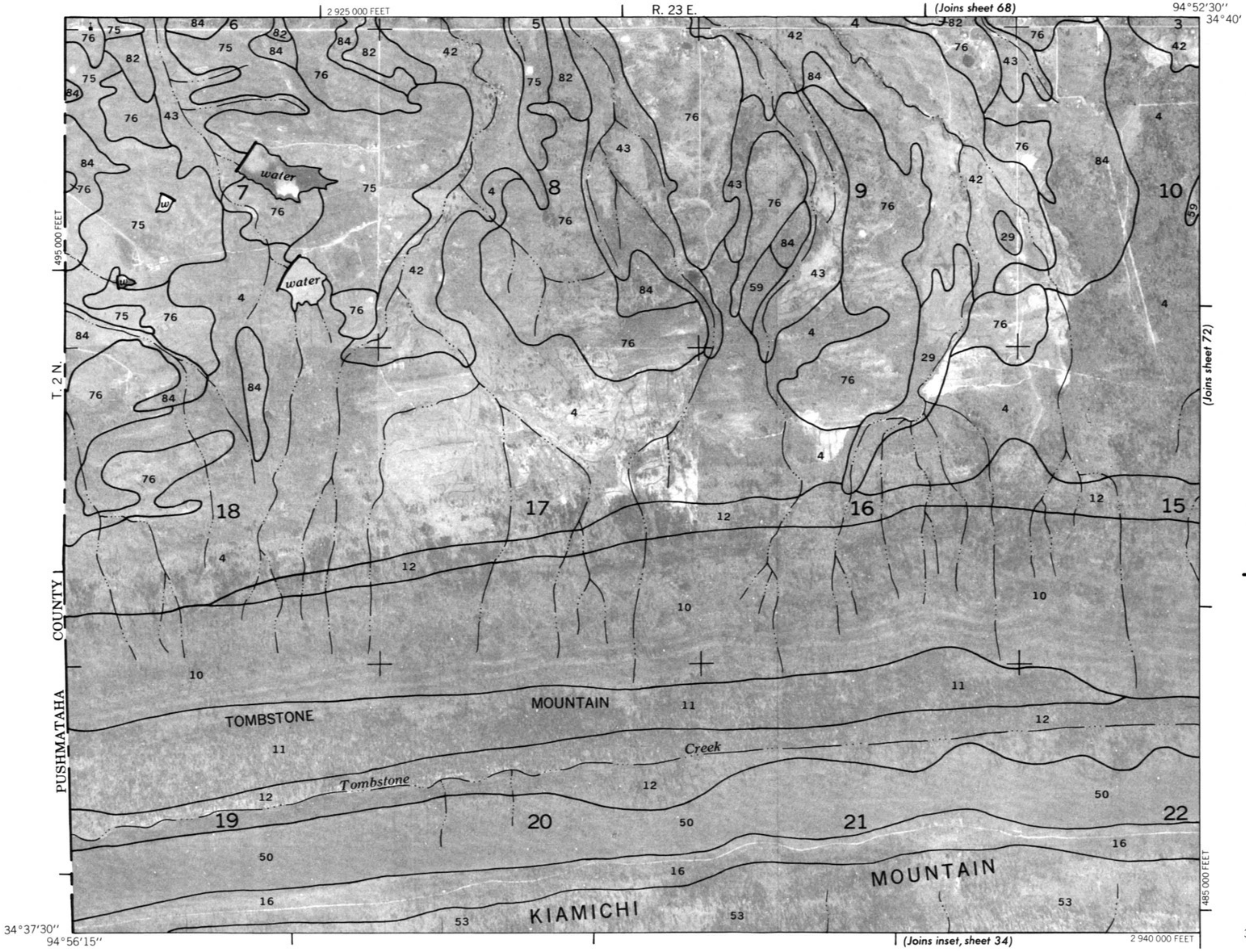


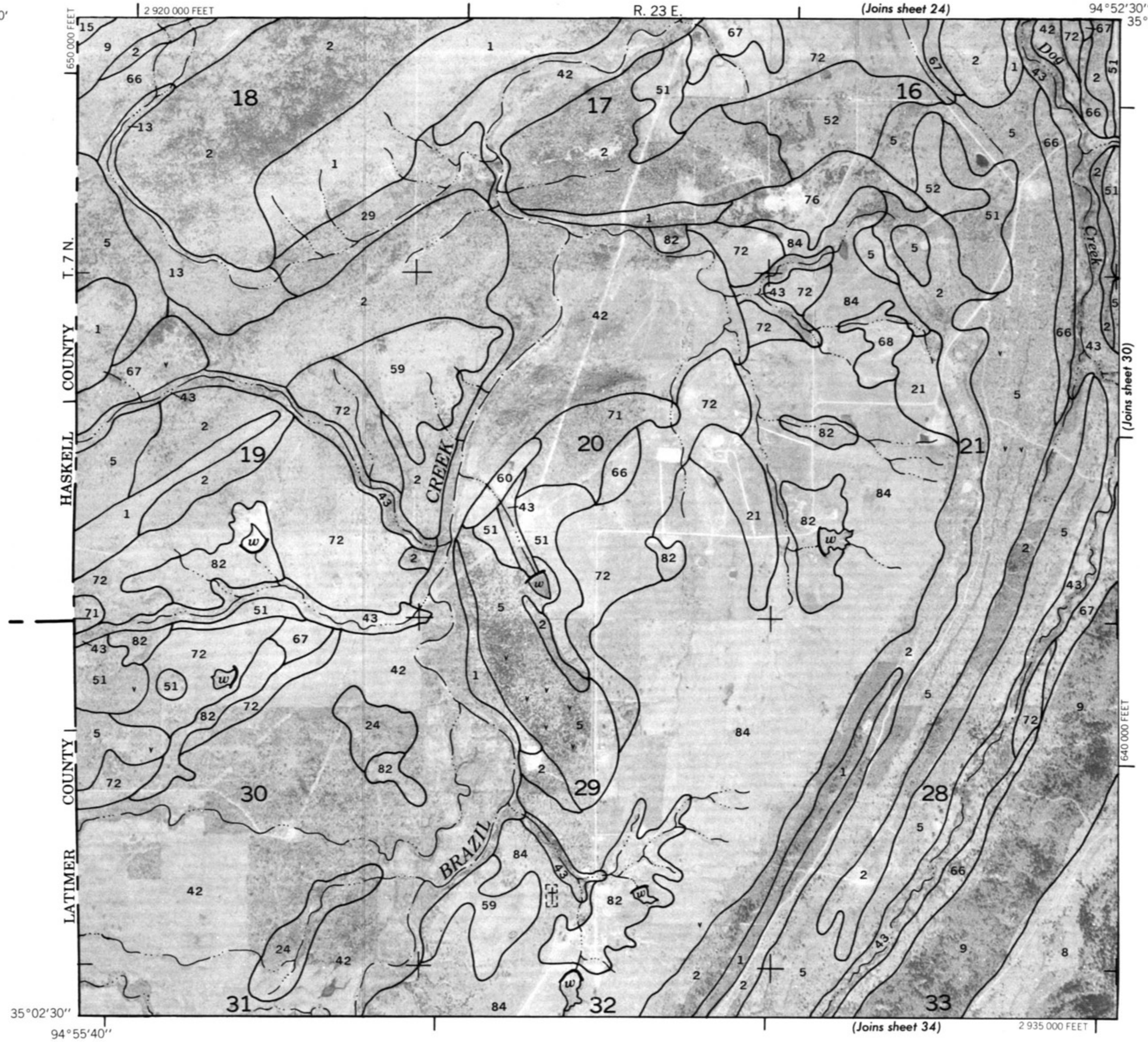
5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

Scale - 1:24000

N



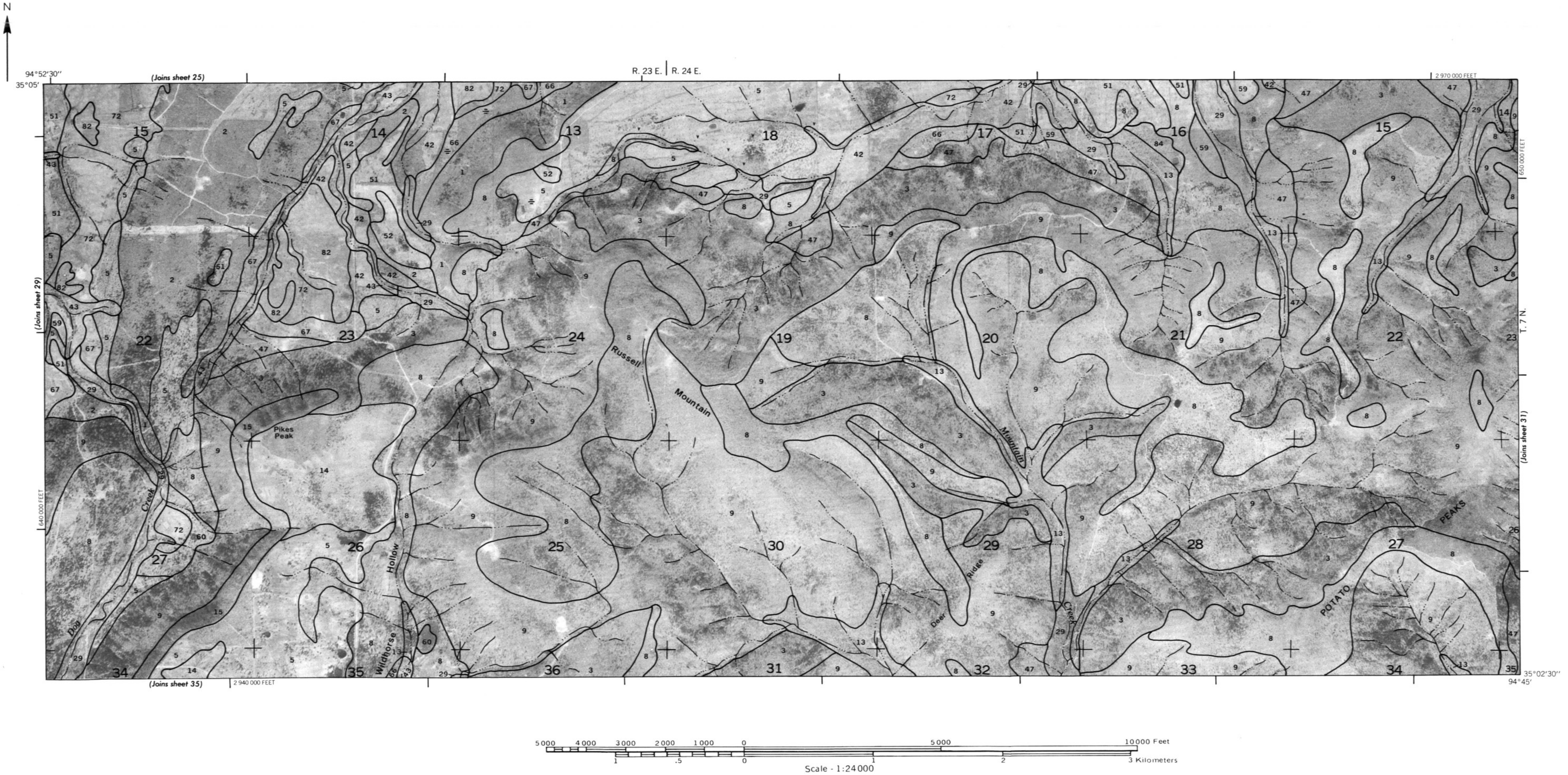


5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

1 .5 0 1 2 3 Kilometers

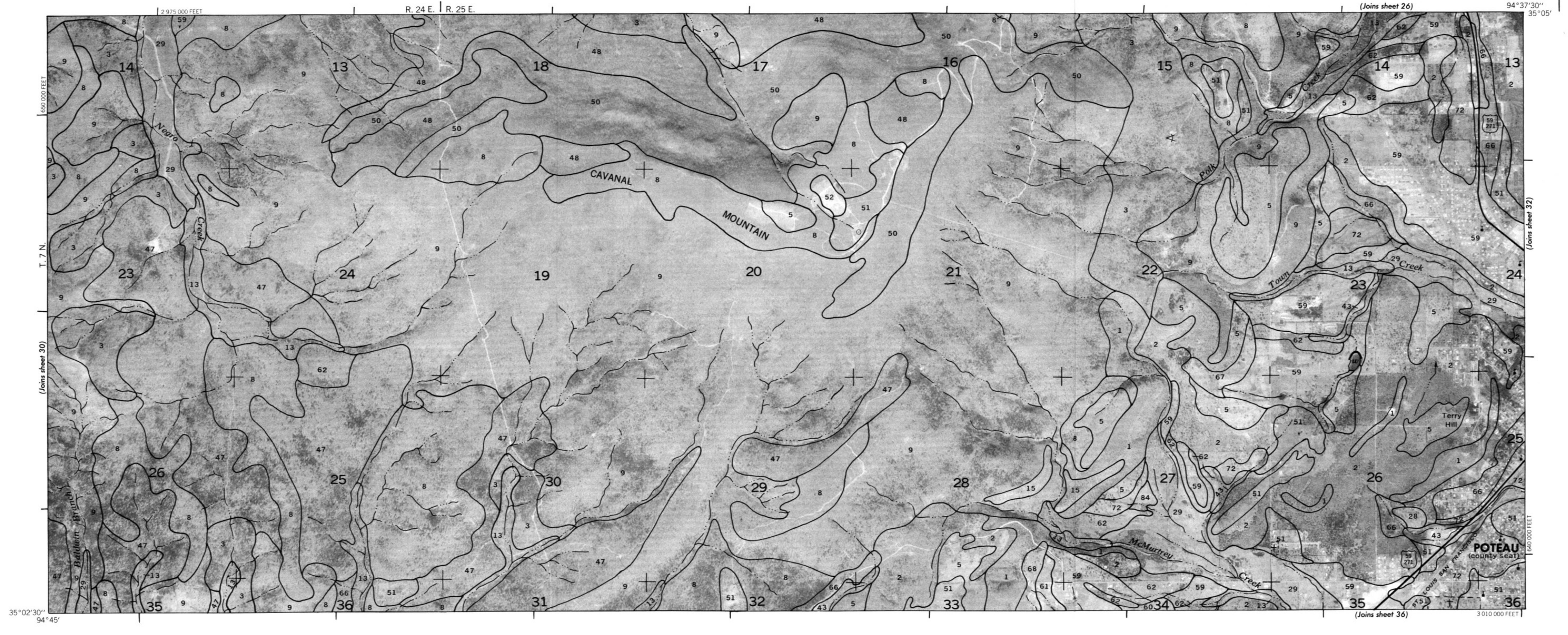
Scale - 1:24 000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 30



31

N

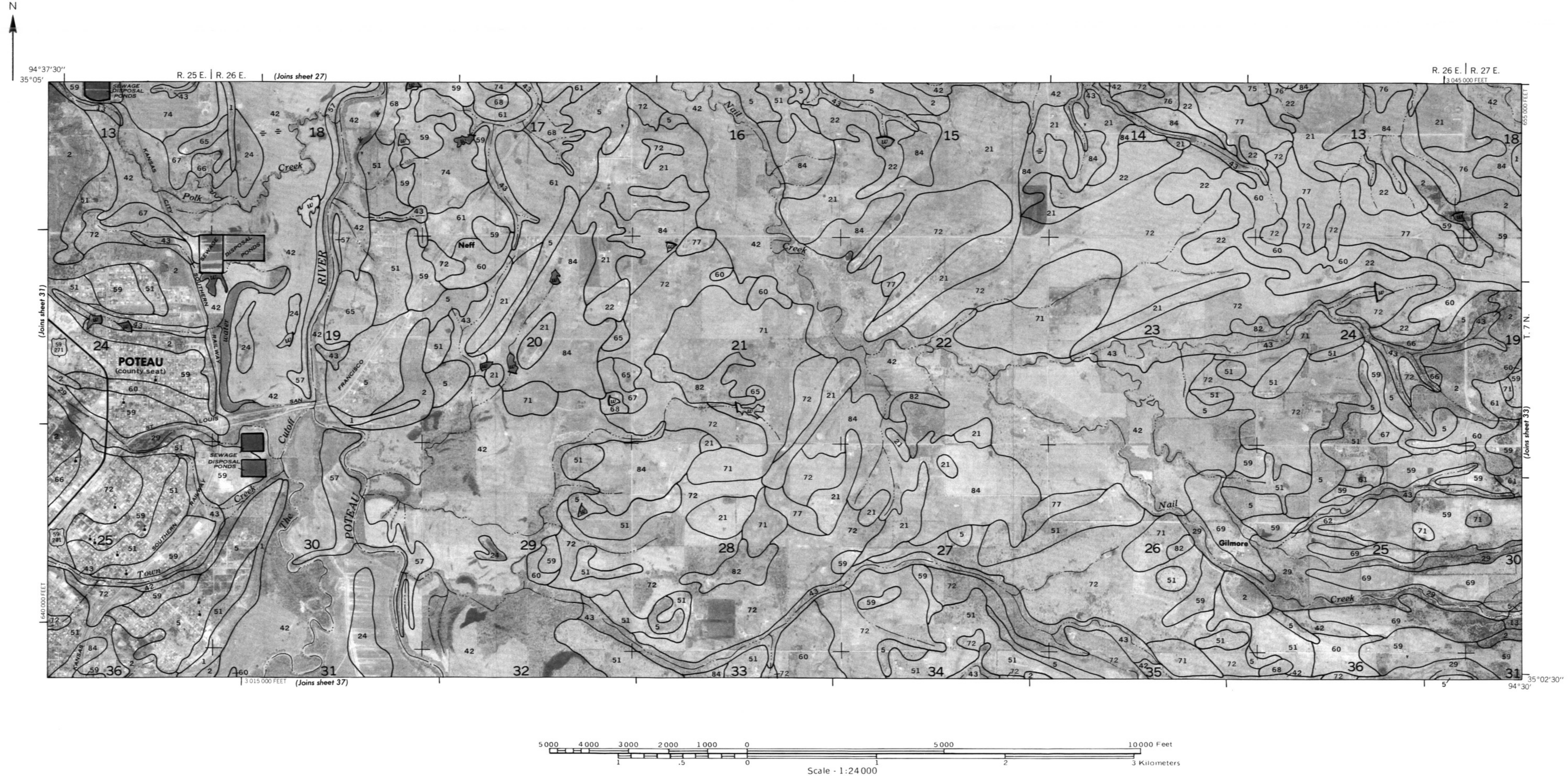


5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

1 .5 0 1 2 3 Kilometers

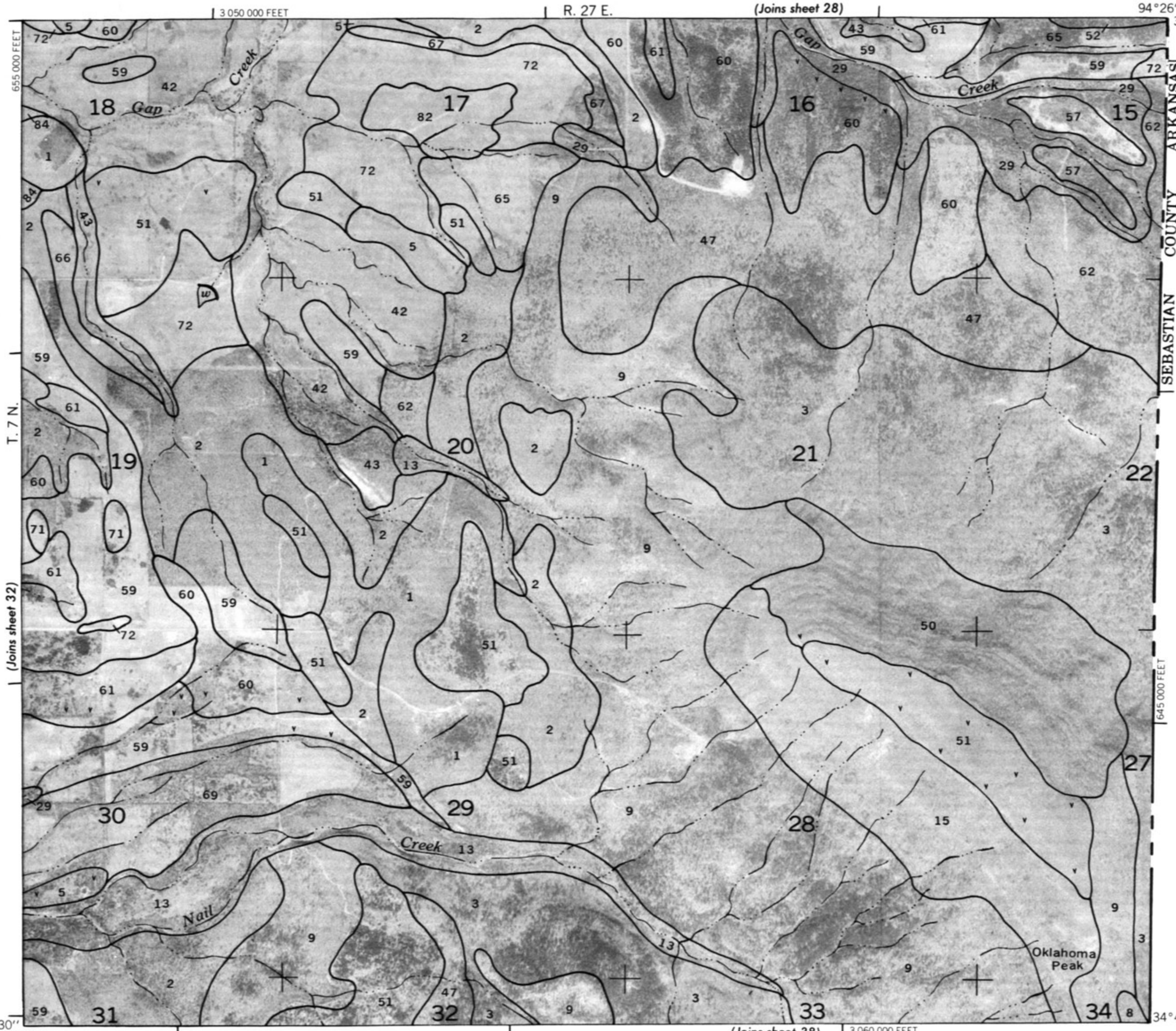
Scale - 1:24 000

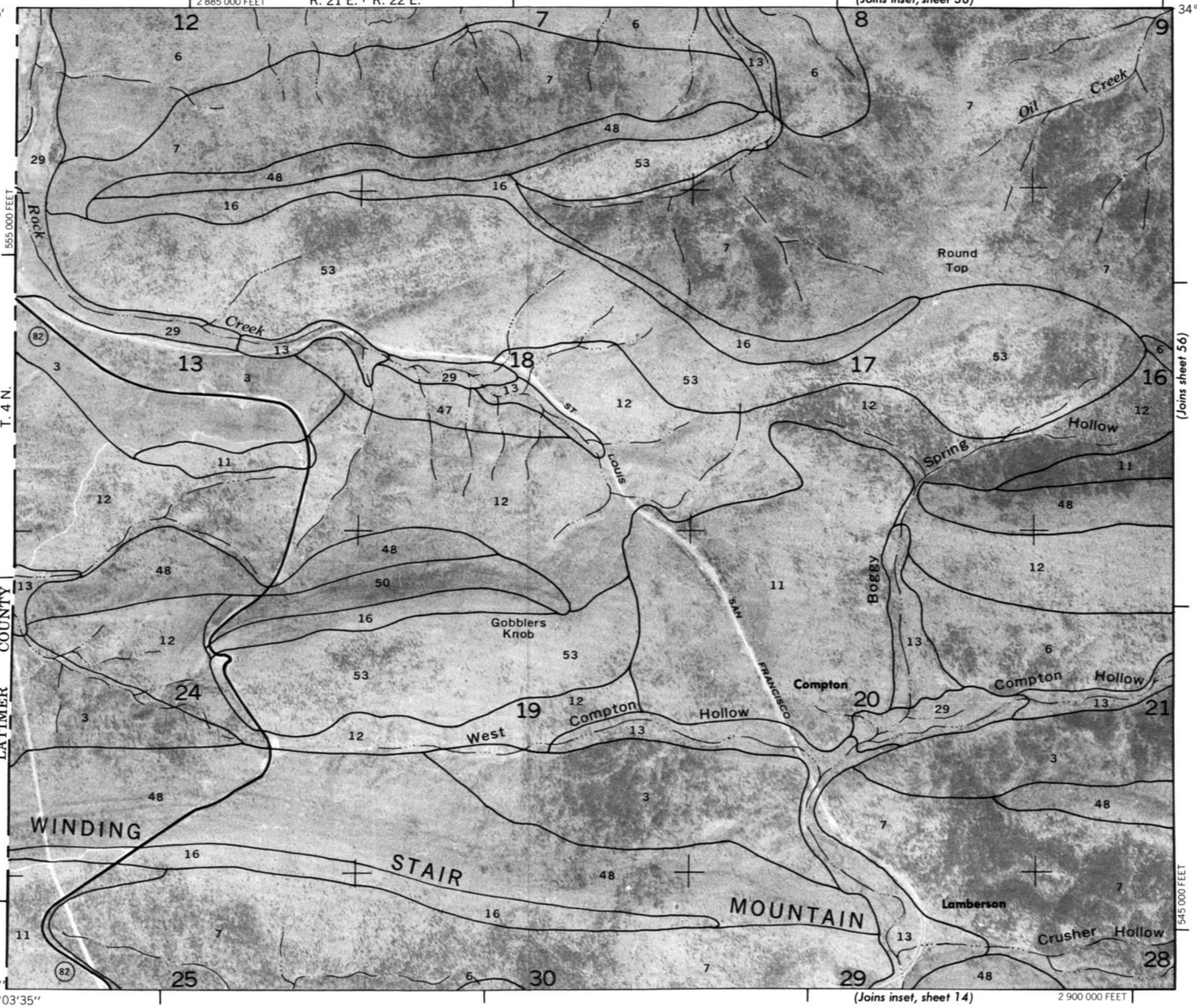
LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 32



33

N



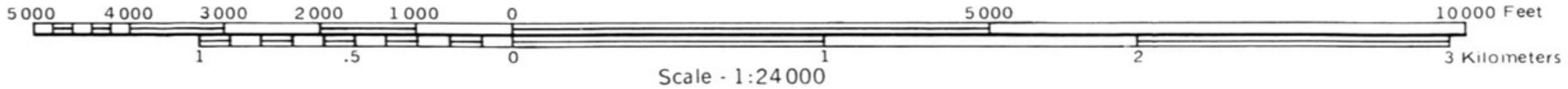


5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

1 .5 0 1 2 3 Kilometers

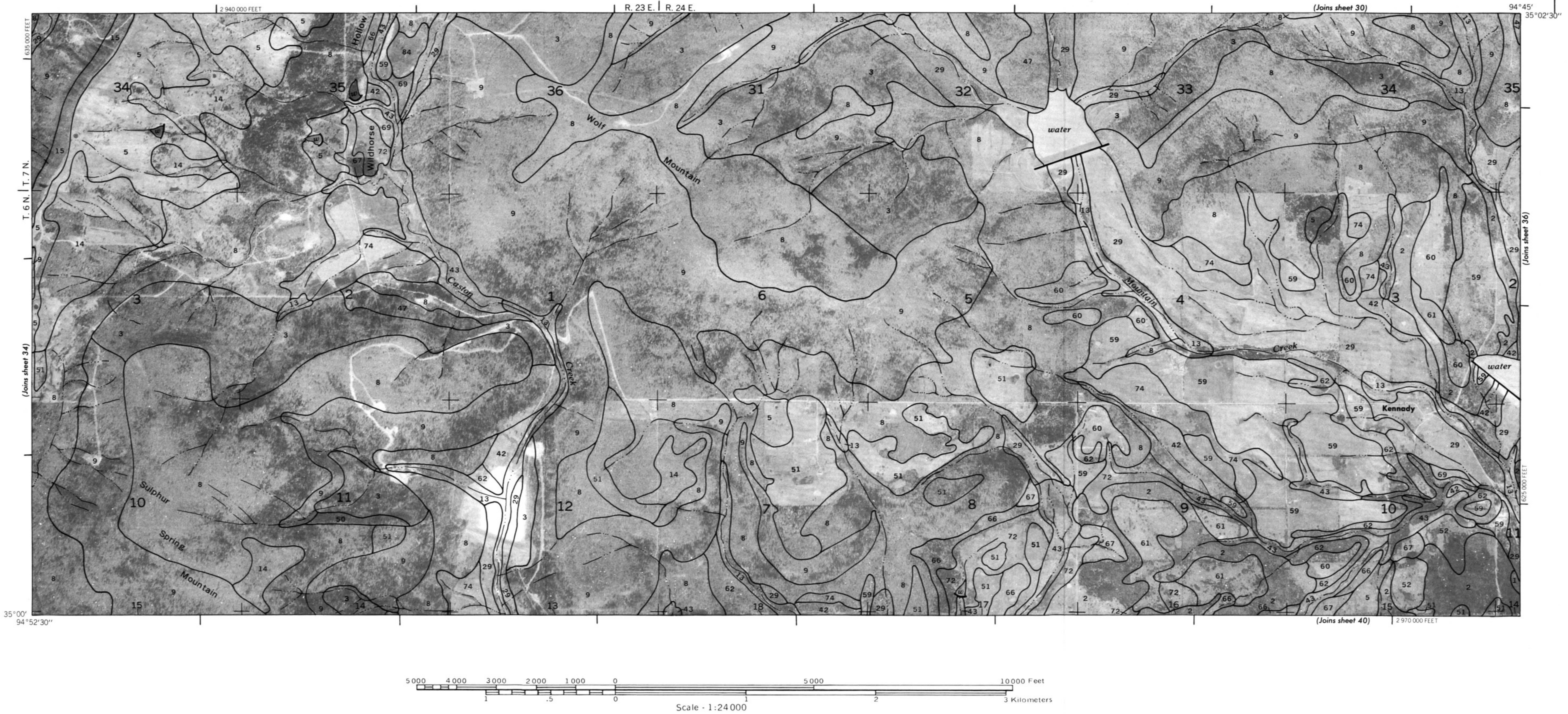
Scale - 1:24 000

N

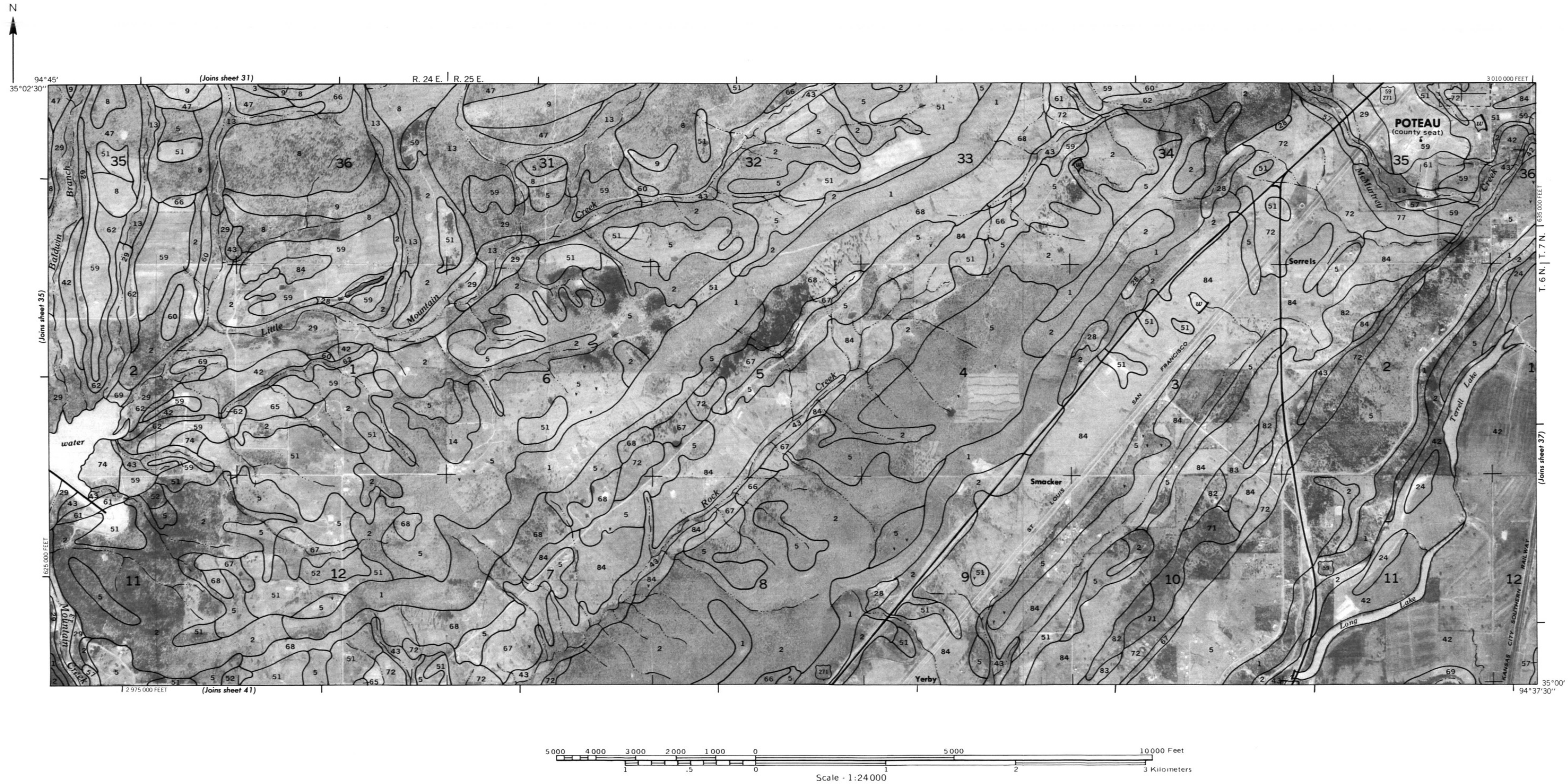


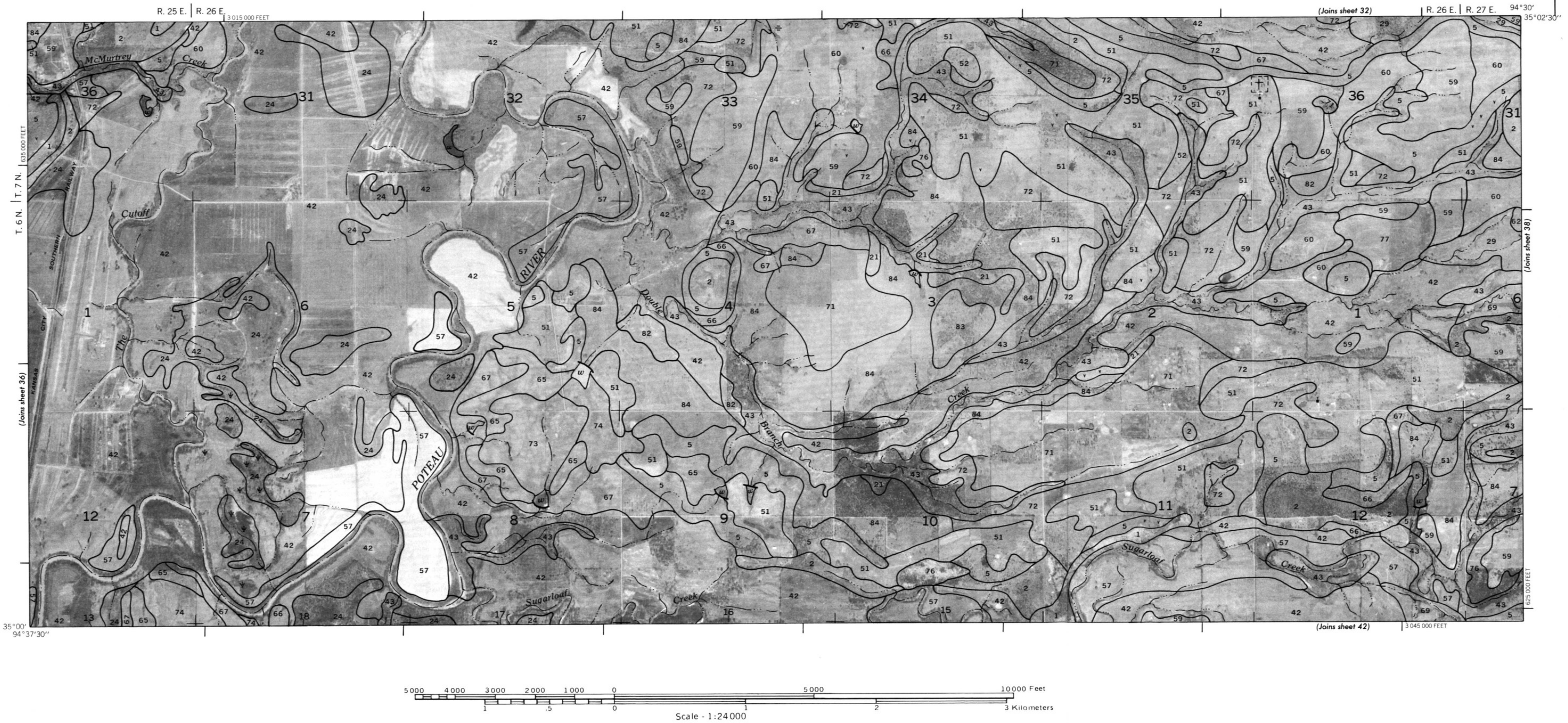
Scale - 1:24000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 35

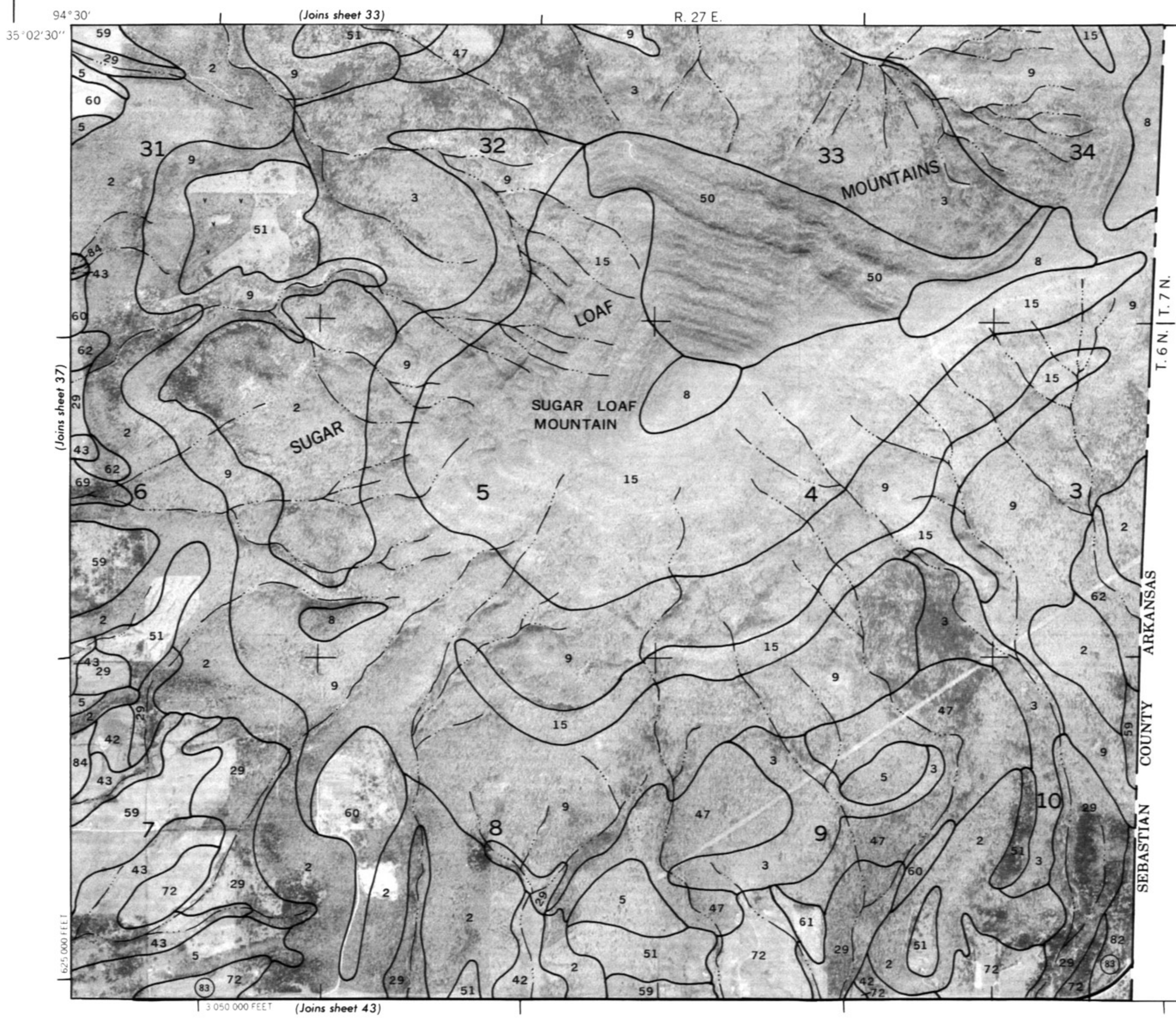


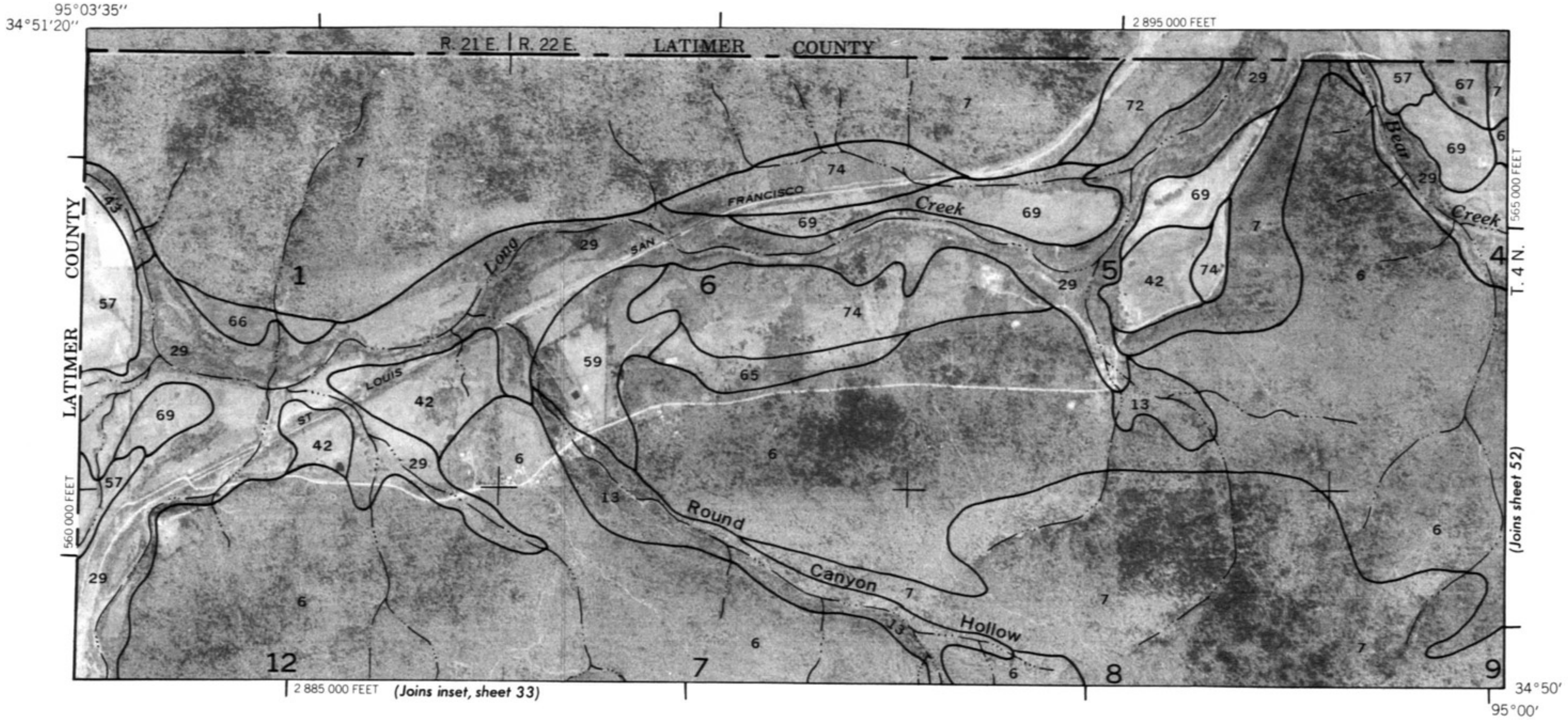
LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 36




N
R. 25 E. | R. 26 E.
3 015 000 FEET
(Joins sheet 32)
R. 26 E. | R. 27 E.
94°30′
35°02′30″
T. 6 N. | T. 7 N.
635 000 FEET
(Joins sheet 36)
(Joins sheet 38)
625 000 FEET
35°00′
94°37′30″
(Joins sheet 42)
3 045 000 FEET
McMurtrey Creek
The Cutoff
SOUTHERN RAILWAY
KANSAS CITY
POTEAU RIVER
Double Branch
Creek
Sugarloaf Creek
Sugarloaf
Creek
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 38





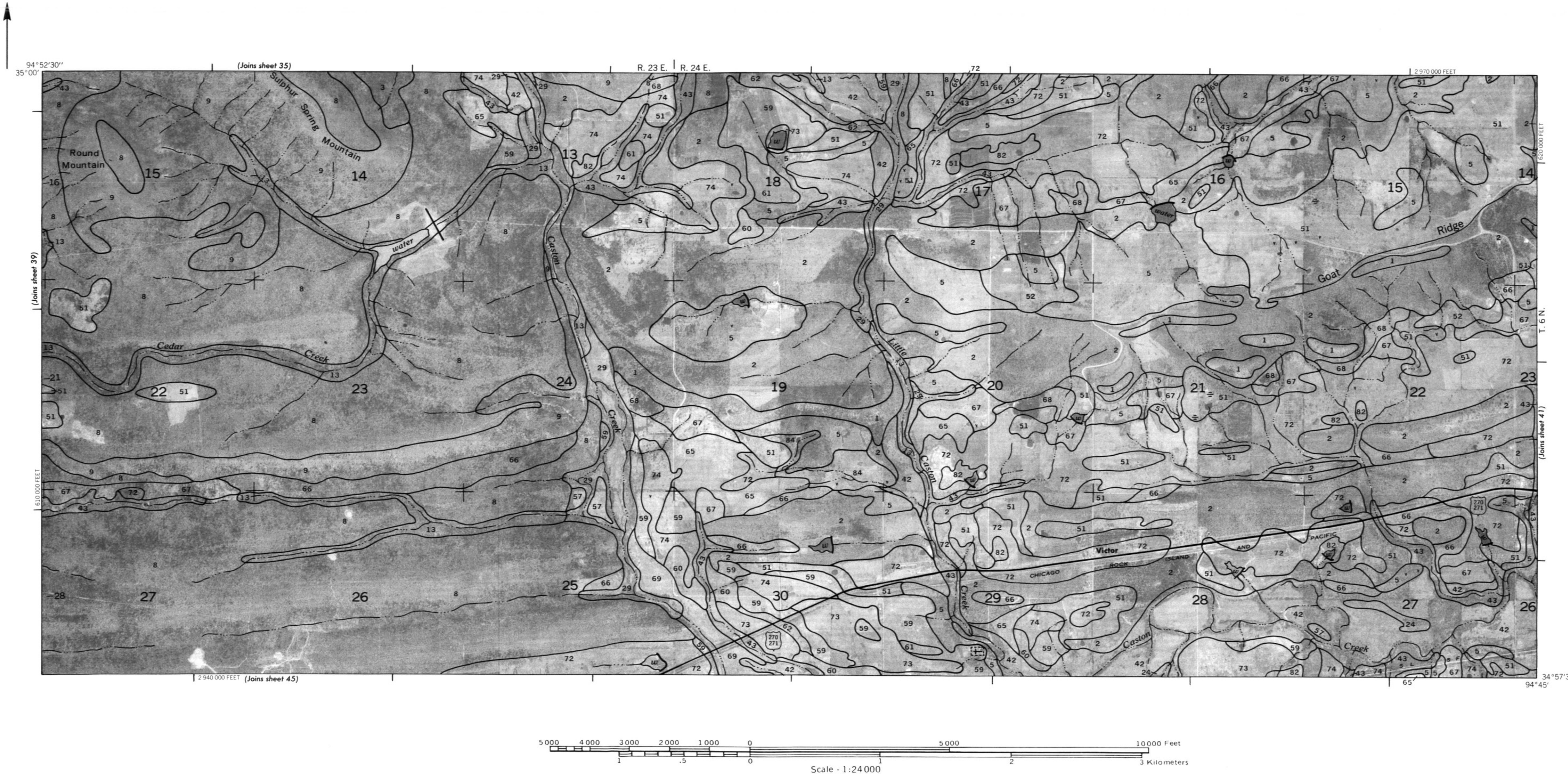
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

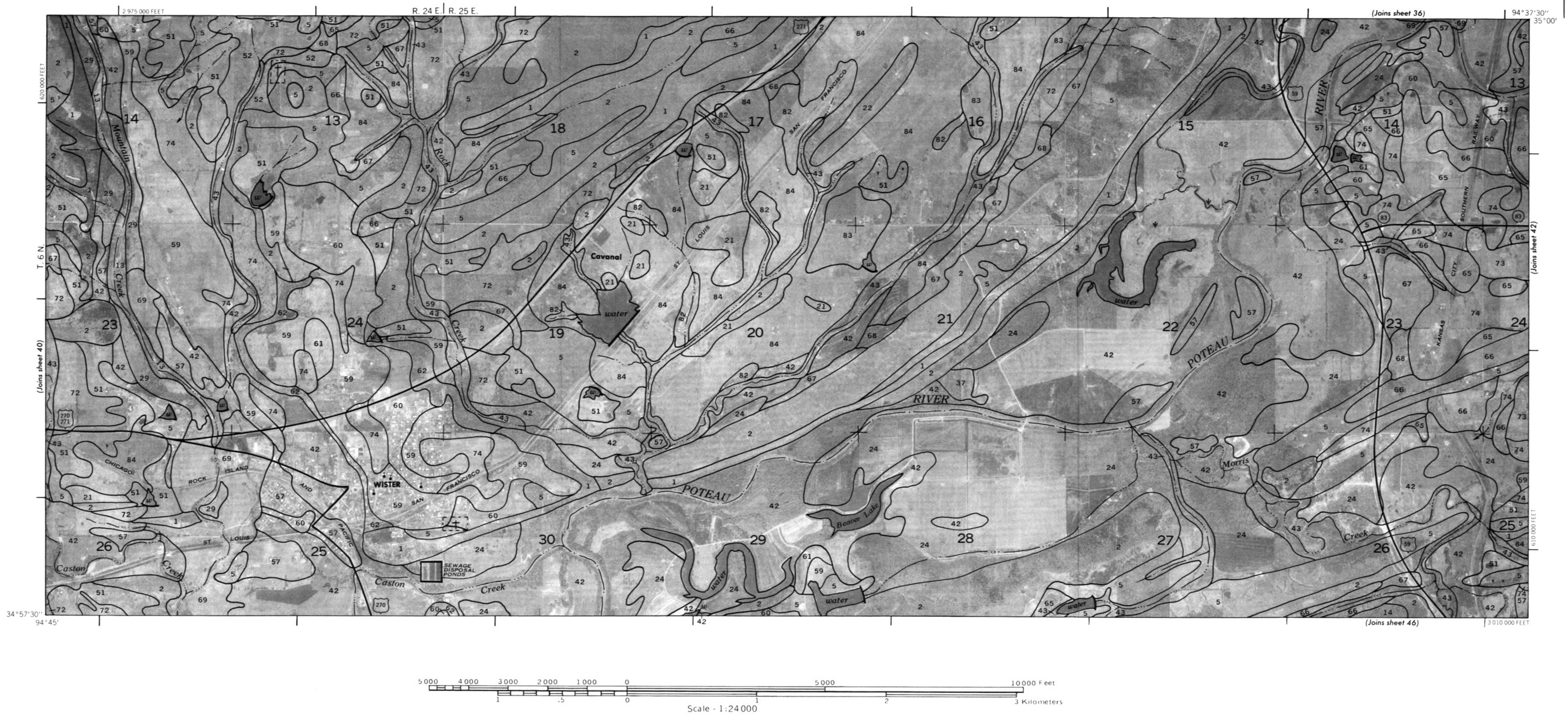
1 .5 0 1 2 3 Kilometers

Scale · 1:24 000


39
N
R. 23 E.
(Joins inset, sheet 34)
94°52'30''
34°35'
2 925 000 FEET
CRANE
MOUNTAIN
Deadman
Hollow
Crane
Hollow
Ridge
Wolf
Gobblers
Knob
Fisher
Branch
Honobia
Creek
Cedar
T. 1 N.
PUSHMATAHA
COUNTY
465 000 FEET
(Joins sheet 78)
455 000 FEET
34°32'30''
94°56'15''
(Joins sheet 81)
2 940 000 FEET
2 920 000 FEET
620 000 FEET
(Joins sheet 34)
94°52'30''
35°00'
PIGEON
Mountain
Cedar
Creek
Coal
Creek
T. 6 N.
LATIMER
COUNTY
(Joins sheet 40)
610 000 FEET
34°57'30''
94°55'40''
(Joins sheet 44)
2 935 000 FEET
5000
4000
3000
2000
1000
0
5000
10000 Feet
1
.5
0
1
2
3 Kilometers
Scale - 1:24000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 40




N
R. 24 E. R. 25 E.
T. 6 N.
(Joins sheet 36)
(Joins sheet 40)
(Joins sheet 42)
(Joins sheet 46)
94°37'30"
35°00'
34°57'30"
94°45'
2 975 000 FEET
620 000 FEET
610 000 FEET
3 010 000 FEET
Cavanal
WISTER
Caston
POTEAU RIVER
Beaver Lake
Mountain Creek
Rock Creek
Caston Creek
Morris Creek
CHICAGO ROCK ISLAND AND PACIFIC
ST. LOUIS SAN FRANCISCO
KANSAS CITY SOUTHERN RAILWAY
SEWAGE DISPOSAL PONDS
water
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 42

N

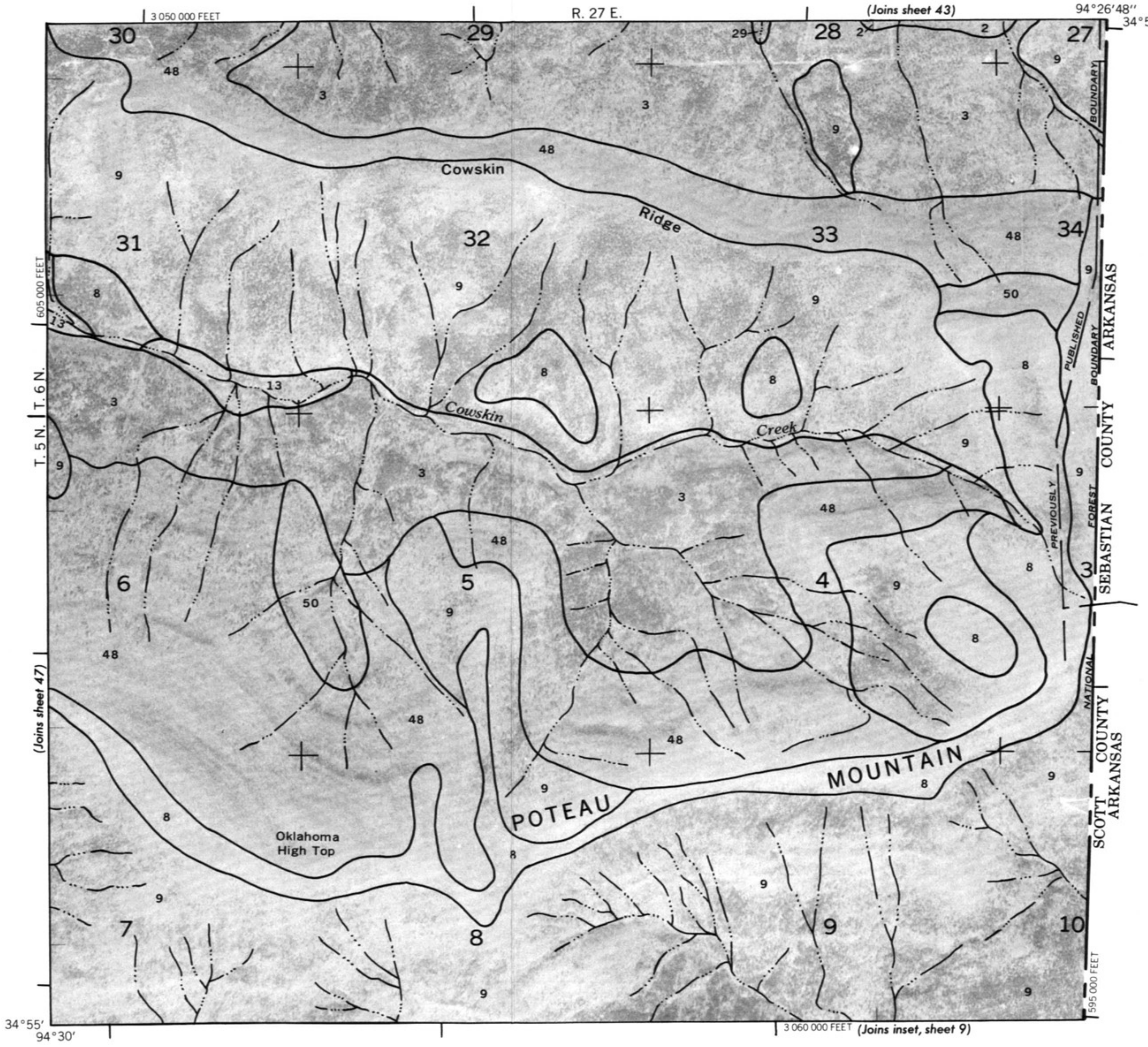
5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

Scale - 1:24000

43

N



5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

1 .5 0 1 2 3 Kilometers

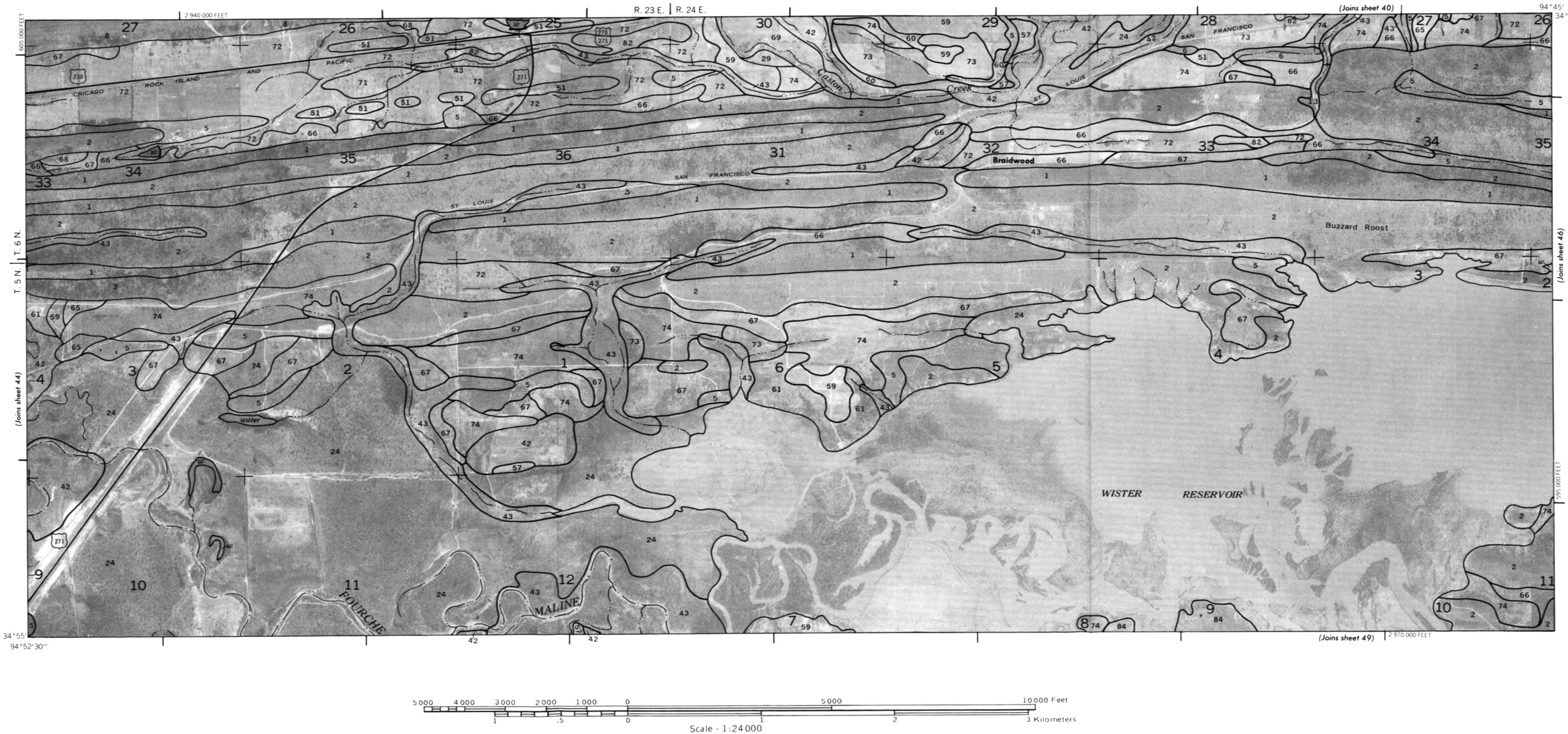
Scale - 1:24 000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 44

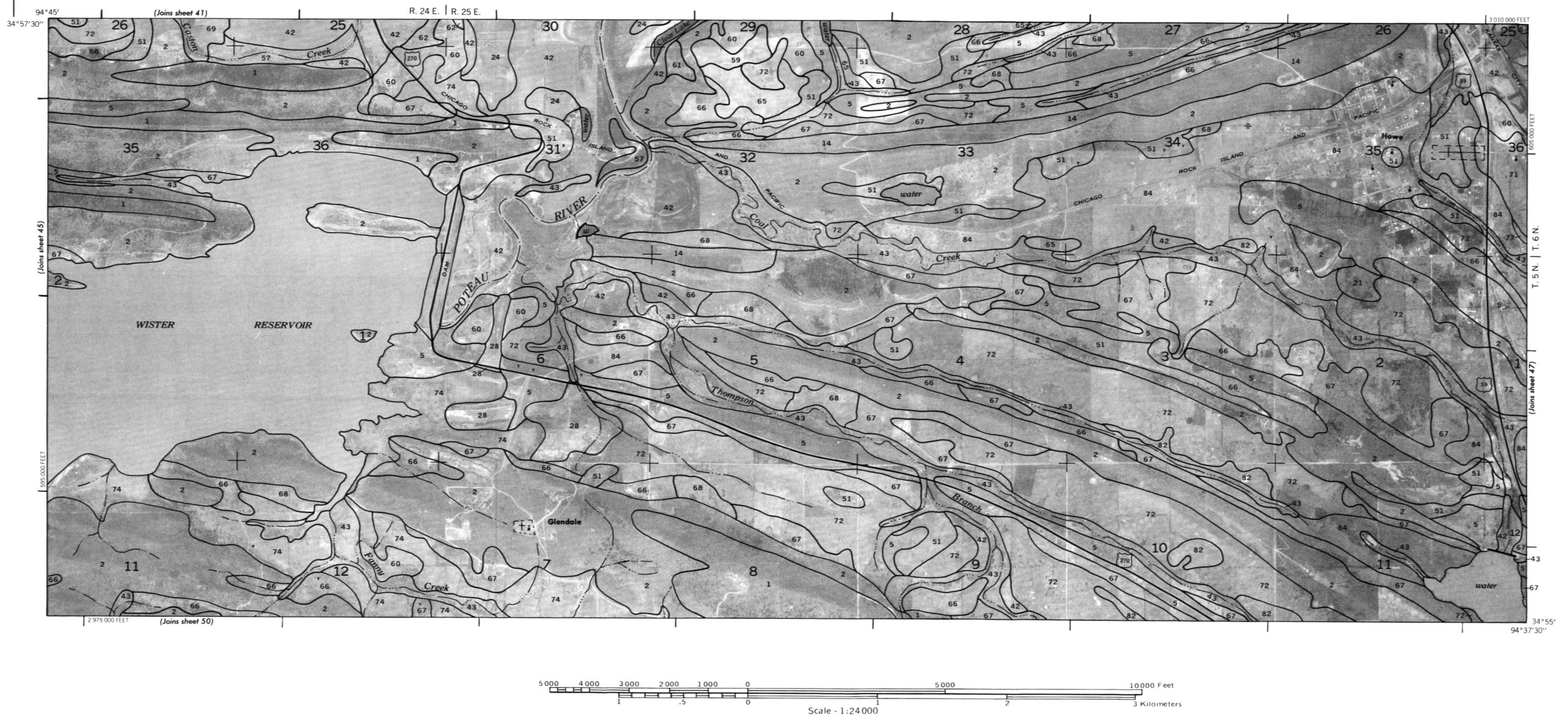
5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

Scale 1:24 000

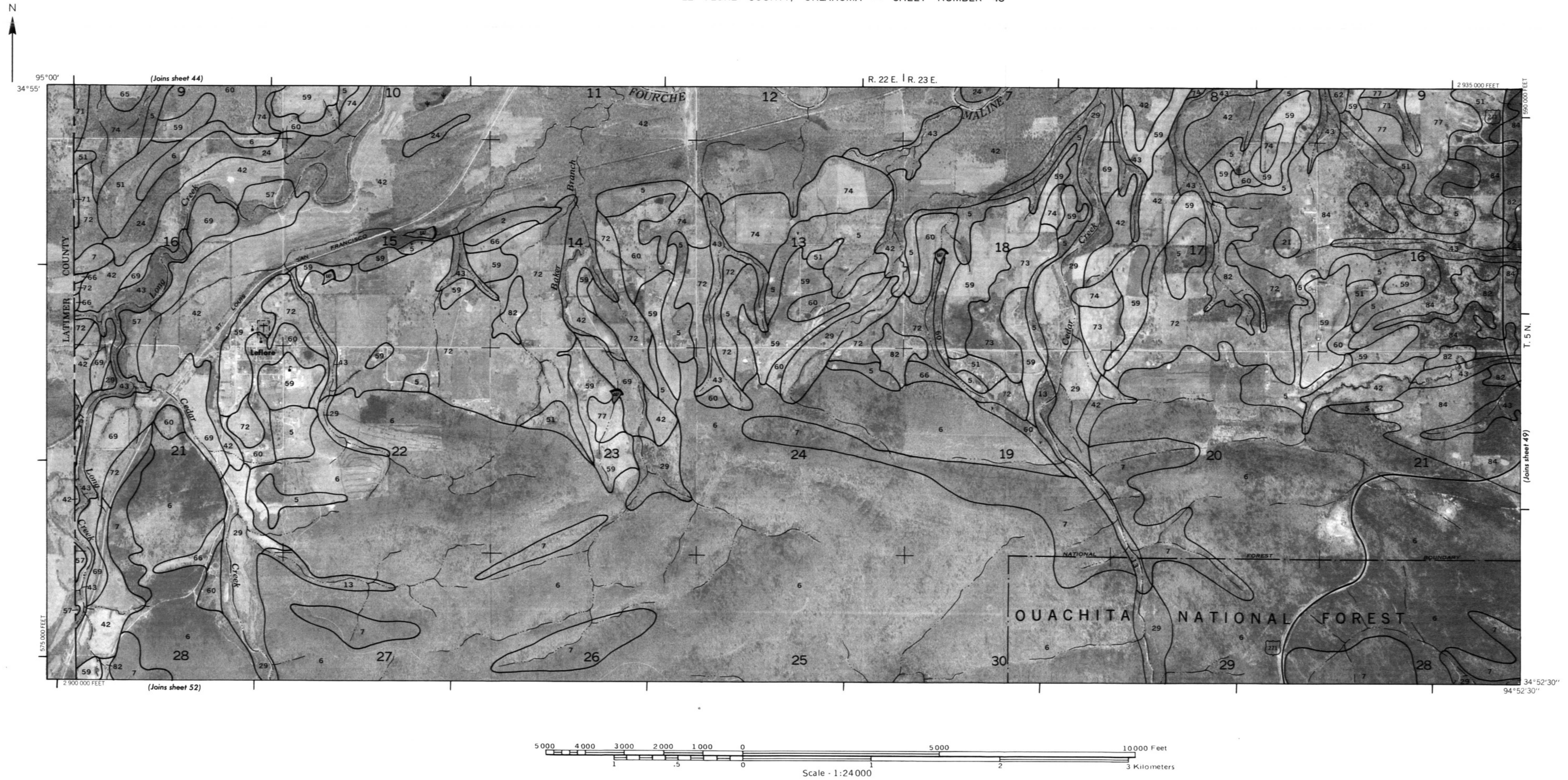

N
R. 23 E. | R. 24 E.
2 940 000 FEET
605 000 FEET
(Joins sheet 40)
94°45'
34°57'30"
T. 6 N.
T. 5 N.
(Joins sheet 44)
(Joins sheet 46)
595 000 FEET
34°55'
94°52'30"
(Joins sheet 49)
2 970 000 FEET
CHICAGO ROCK ISLAND AND PACIFIC
SAN FRANCISCO
ST LOUIS
Caston Creek
Braidwood
Buzzard Roost
WISTER RESERVOIR
FOURCHE MALINE
water
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

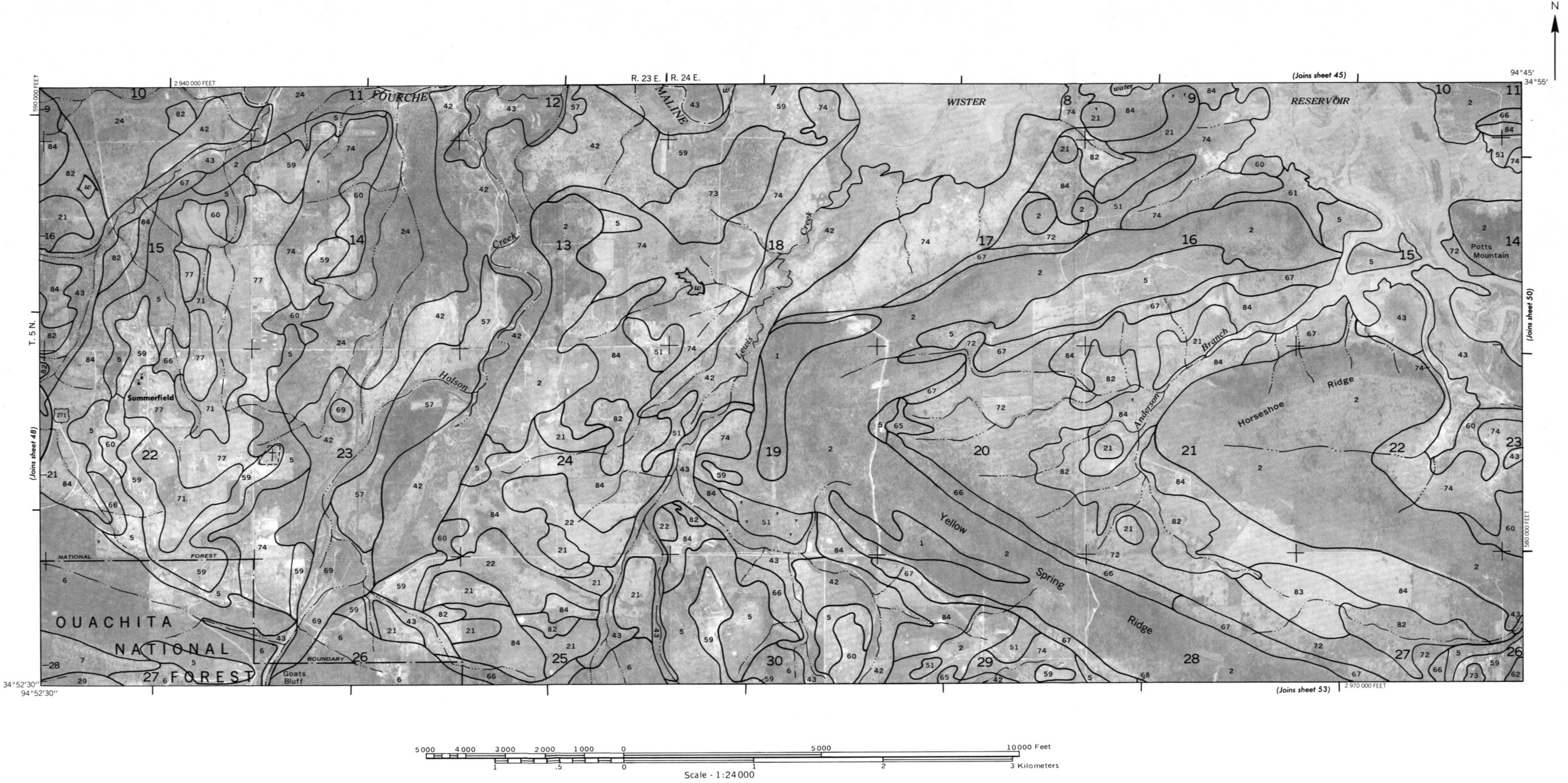
LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 46




N
R. 25 E. | R. 26 E.
R. 26 E. | R. 27 E.
94°30′
34°57′30″
34°55′
94°37′30″
(Joins sheet 42)
(Joins sheet 46)
(Joins inset, sheet 43)
(Joins sheet 51)
3 015 000 FEET
3 045 000 FEET
605 000 FEET
595 000 FEET
T. 6 N.
T. 5 N.
KANSAS CITY SOUTHERN RAILWAY
Morris Creek
Dry Creek
Round Mountain
Forest Hill
water
POTEAU MOUNTAIN
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

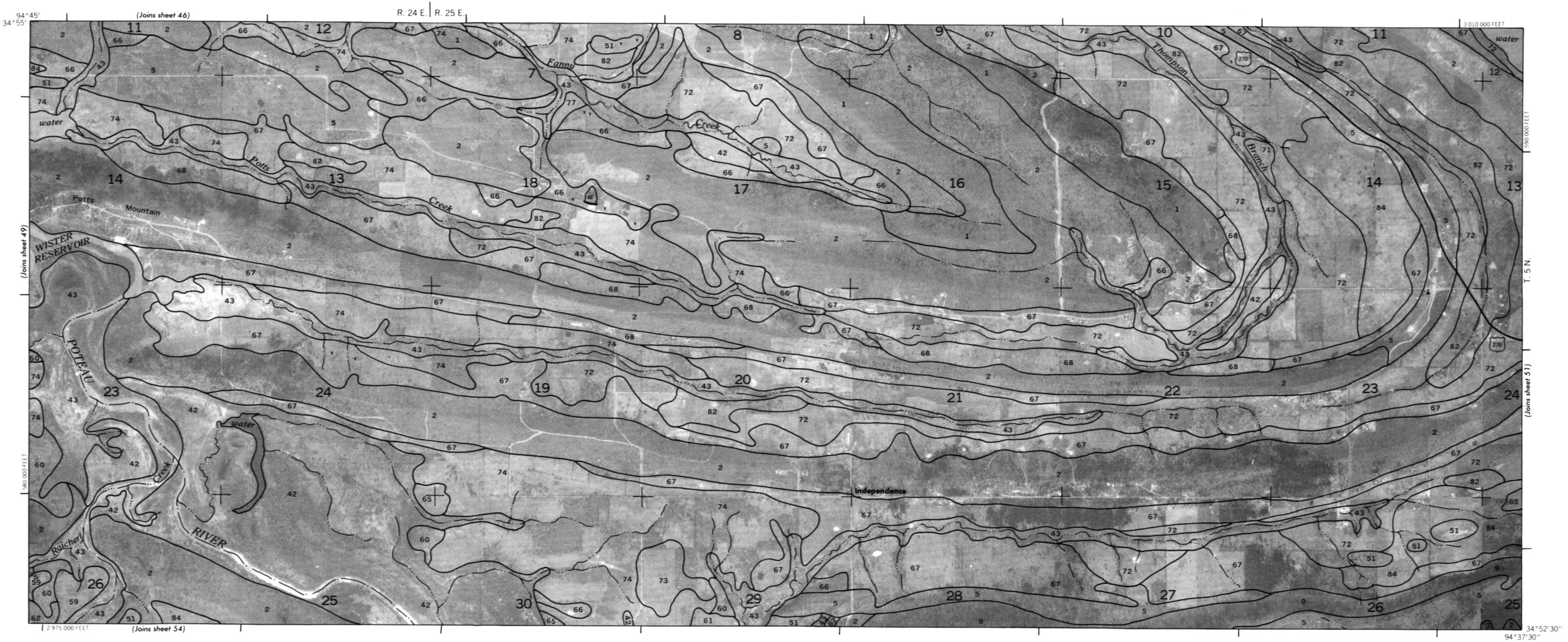
LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 48




N
R. 23 E.
R. 24 E.
2 940 000 FEET
590 000 FEET
(Joins sheet 45)
94°45′
34°55′
FOURCHE
MALINE
WISTER
RESERVOIR
water
Holson
Creek
Lewis
Creek
Summerfield
Potts
Mountain
Anderson
Branch
Horseshoe
Ridge
Yellow
Spring
Ridge
T. 5 N.
(Joins sheet 48)
(Joins sheet 50)
580 000 FEET
NATIONAL
FOREST
BOUNDARY
OUACHITA
NATIONAL
FOREST
Goats
Bluff
34°52′30″
94°52′30″
(Joins sheet 53)
2 970 000 FEET
5000
4000
3000
2000
1000
0
5000
10000 Feet
1
.5
0
1
2
3 Kilometers
Scale - 1:24000

N

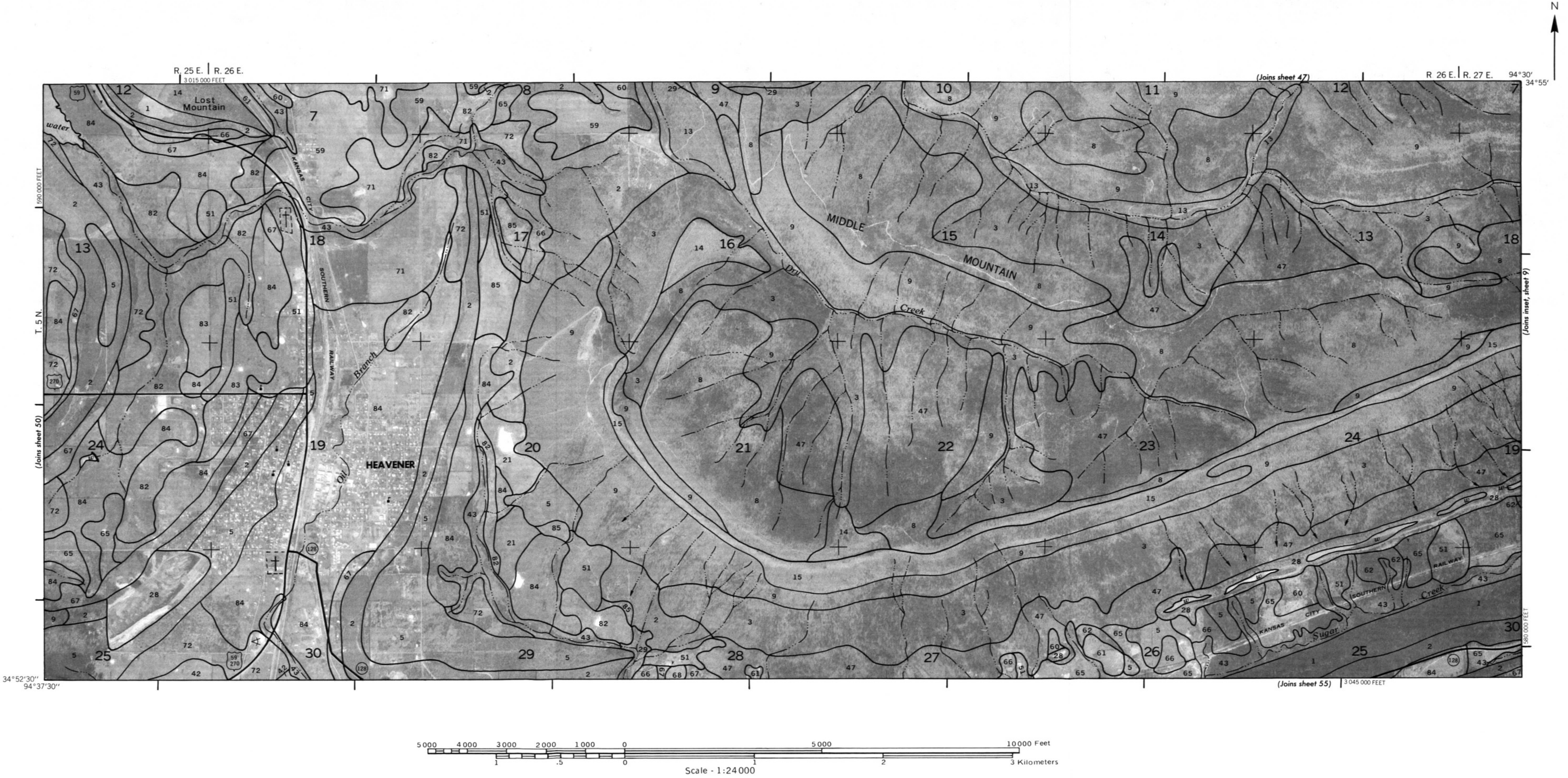
LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 50



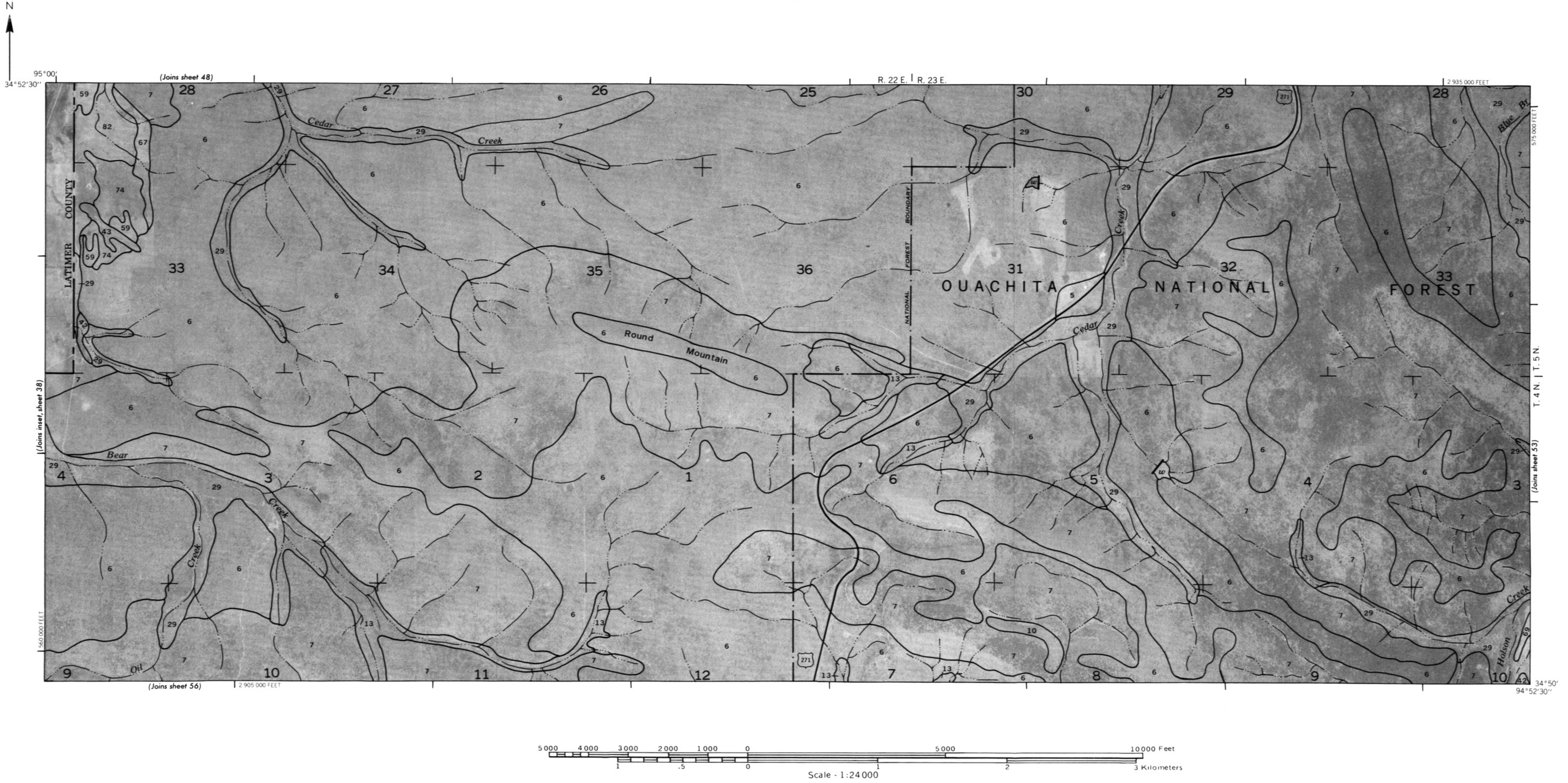
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

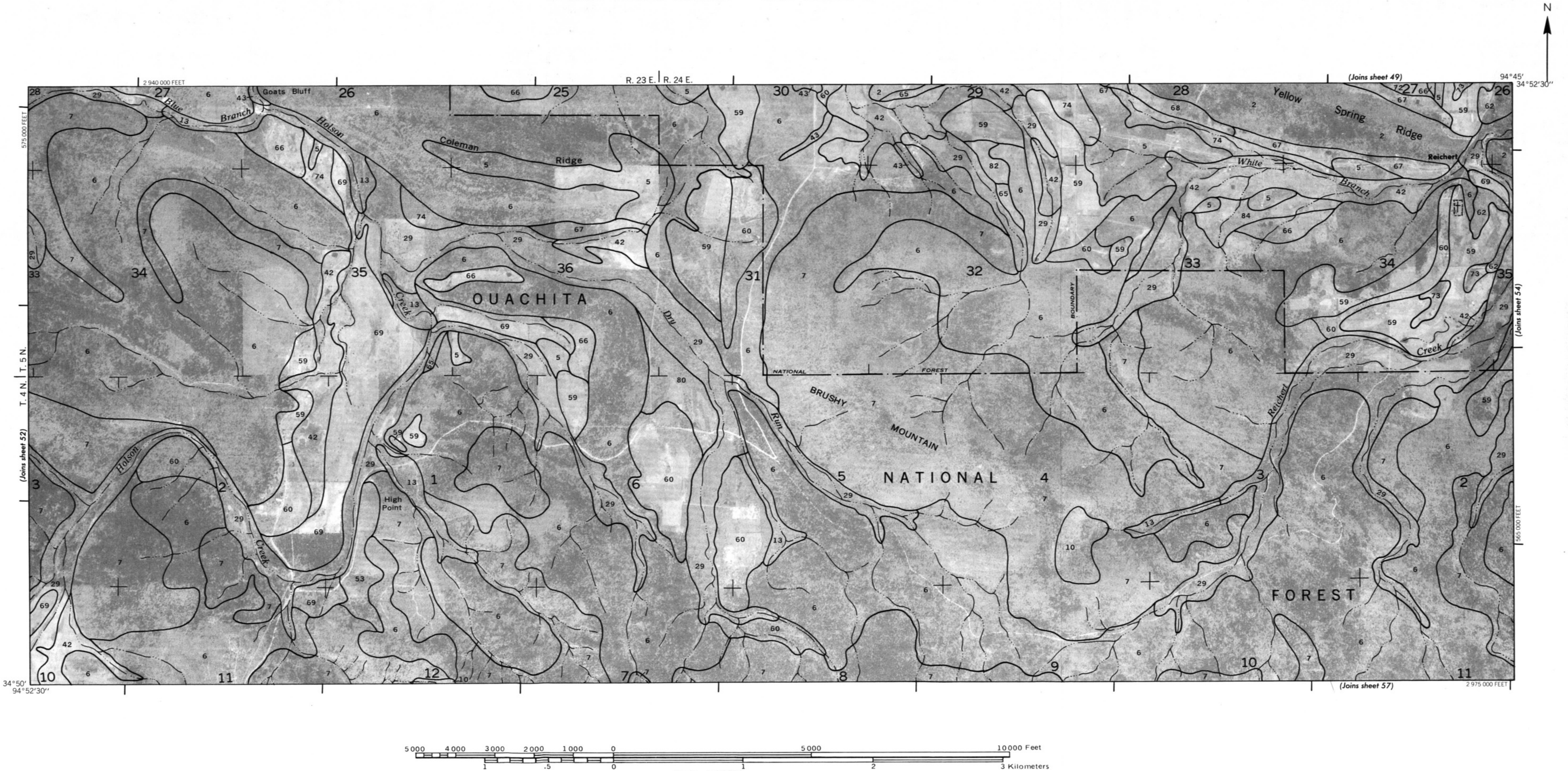
1 .5 0 1 2 3 Kilometers

Scale - 1:24 000


N
R. 25 E. | R. 26 E.
3 015 000 FEET
R. 26 E. | R. 27 E.
94°30′
34°55′
(Joins sheet 47)
590 000 FEET
T. 5 N.
(Joins sheet 50)
(Joins inset, sheet 9)
580 000 FEET
34°52′30″
94°37′30″
(Joins sheet 55)
3 045 000 FEET
Lost Mountain
water
KANSAS CITY SOUTHERN RAILWAY
Branch
Oil
HEAVENER
MIDDLE MOUNTAIN
Dry Creek
Sugar Creek
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 52





Scale - 1:24000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 54

(Joins sheet 50)

Scale - 1:24 000

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

1 .5 0 1 2 3 Kilometers

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 55

5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

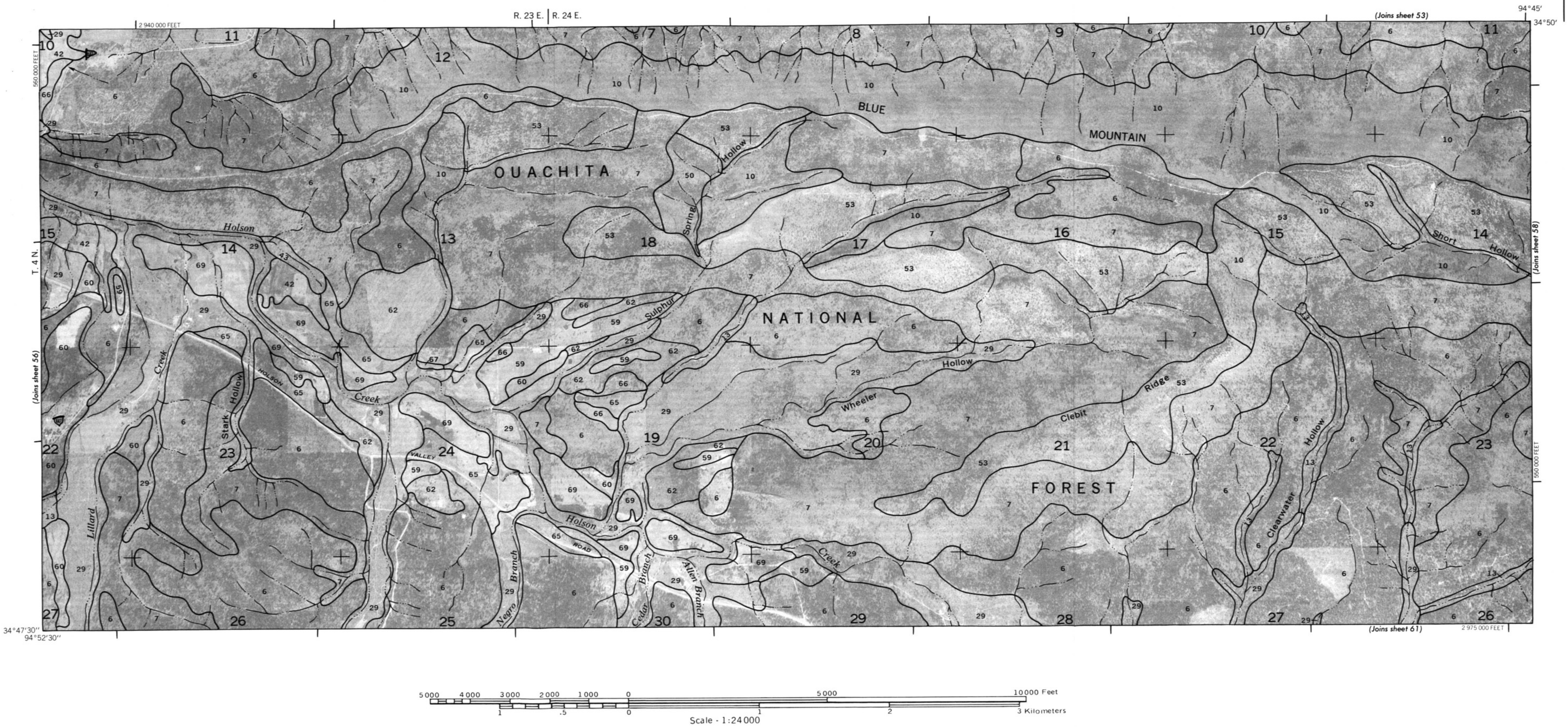
Scale - 1:24 000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 56

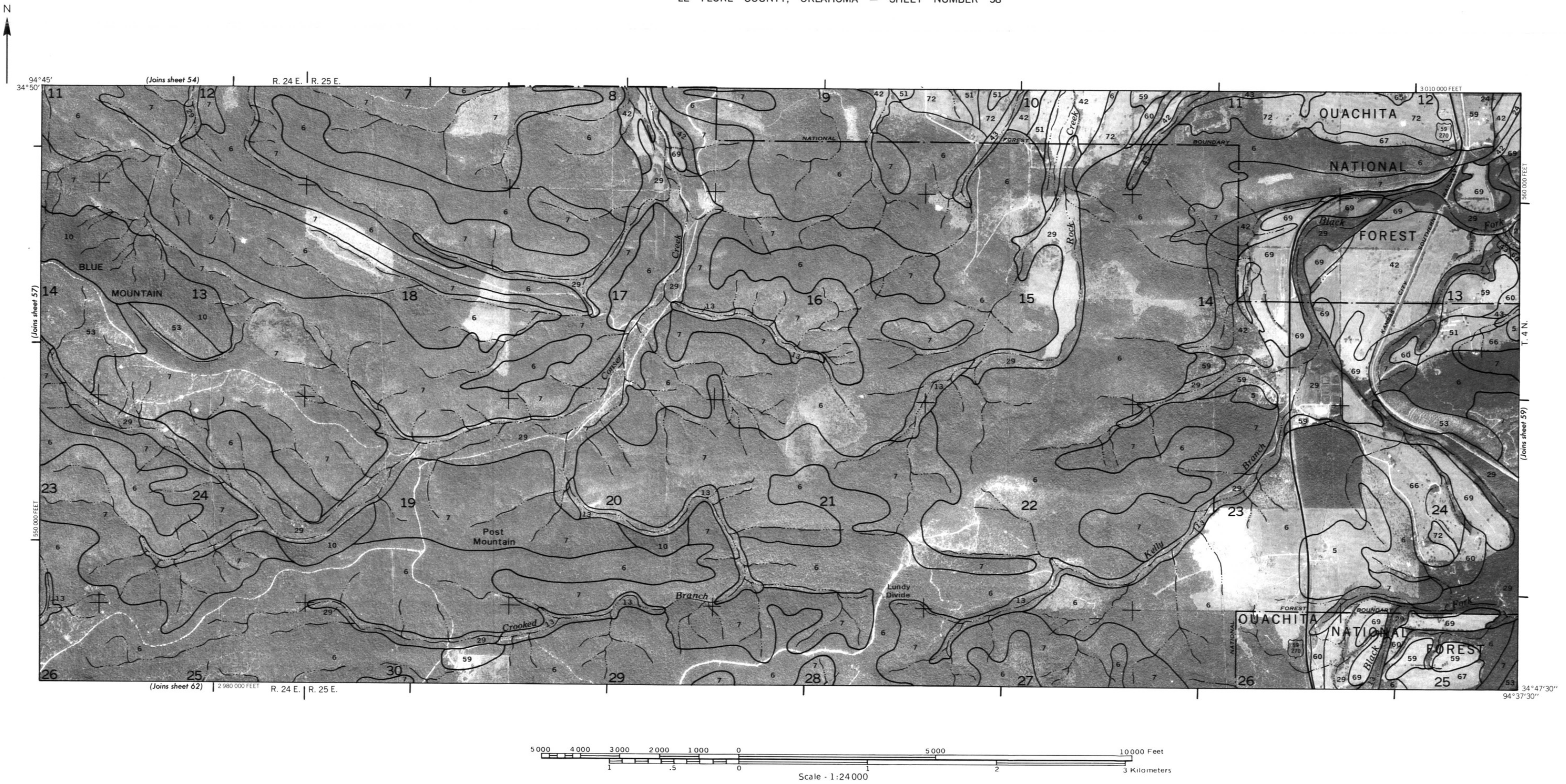
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

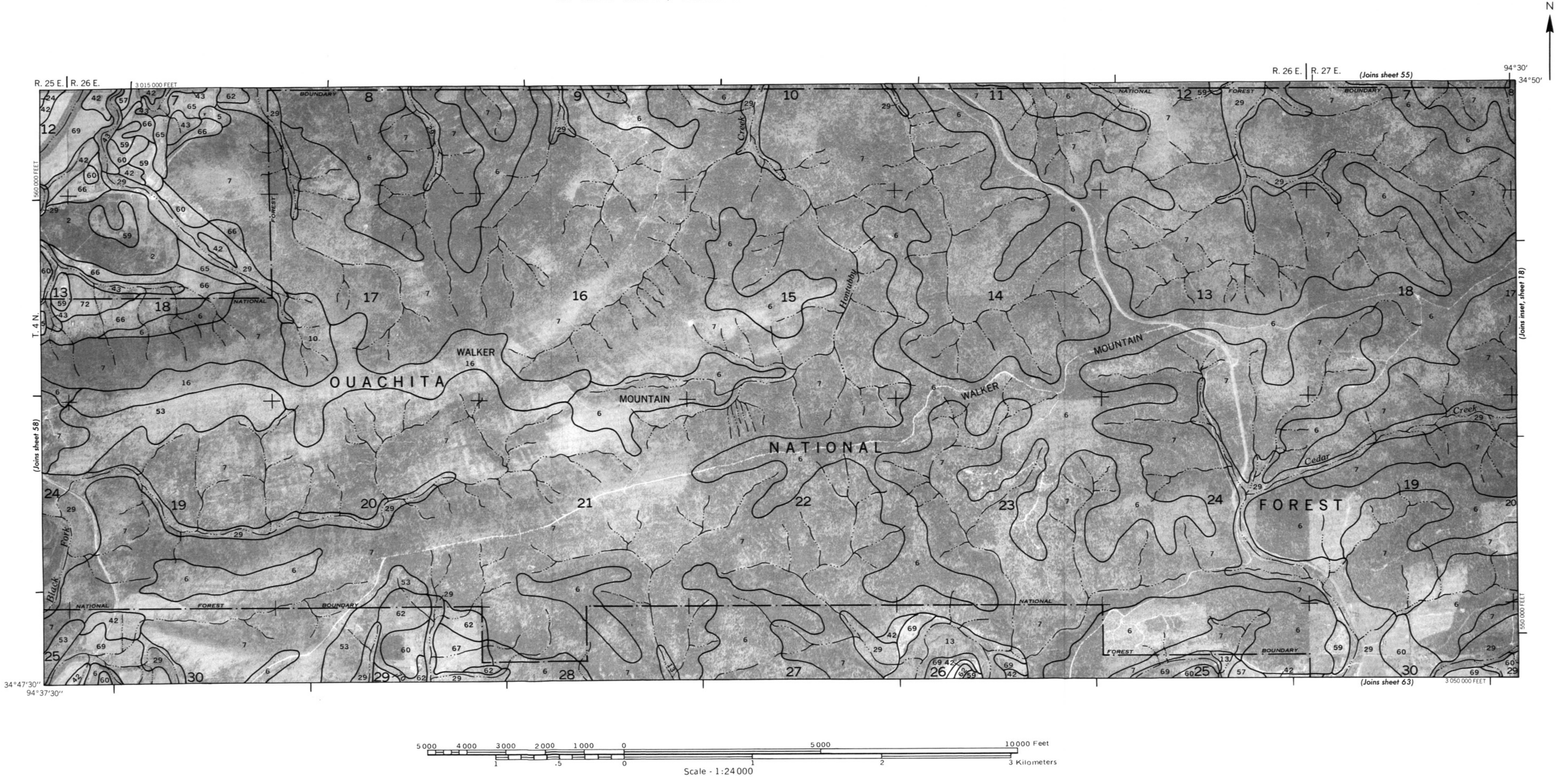
1 .5 0 1 2 3 Kilometers

Scale - 1:24 000


N
R. 23 E. | R. 24 E.
(Joins sheet 53)
94°45′
34°50′
2 940 000 FEET
560 000 FEET
T. 4 N.
(Joins sheet 56)
(Joins sheet 58)
550 000 FEET
(Joins sheet 61)
2 975 000 FEET
34°47′30″
94°52′30″
OUACHITA
NATIONAL
FOREST
BLUE
MOUNTAIN
Holson
Creek
HOLSON
VALLEY
ROAD
Stark
Hollow
Lillard
Creek
Negro
Branch
Cedar
Branch
Allen
Branch
Spring
Hollow
Sulphur
Wheeler
Hollow
Clebit
Ridge
Clearwater
Hollow
Short
Hollow
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

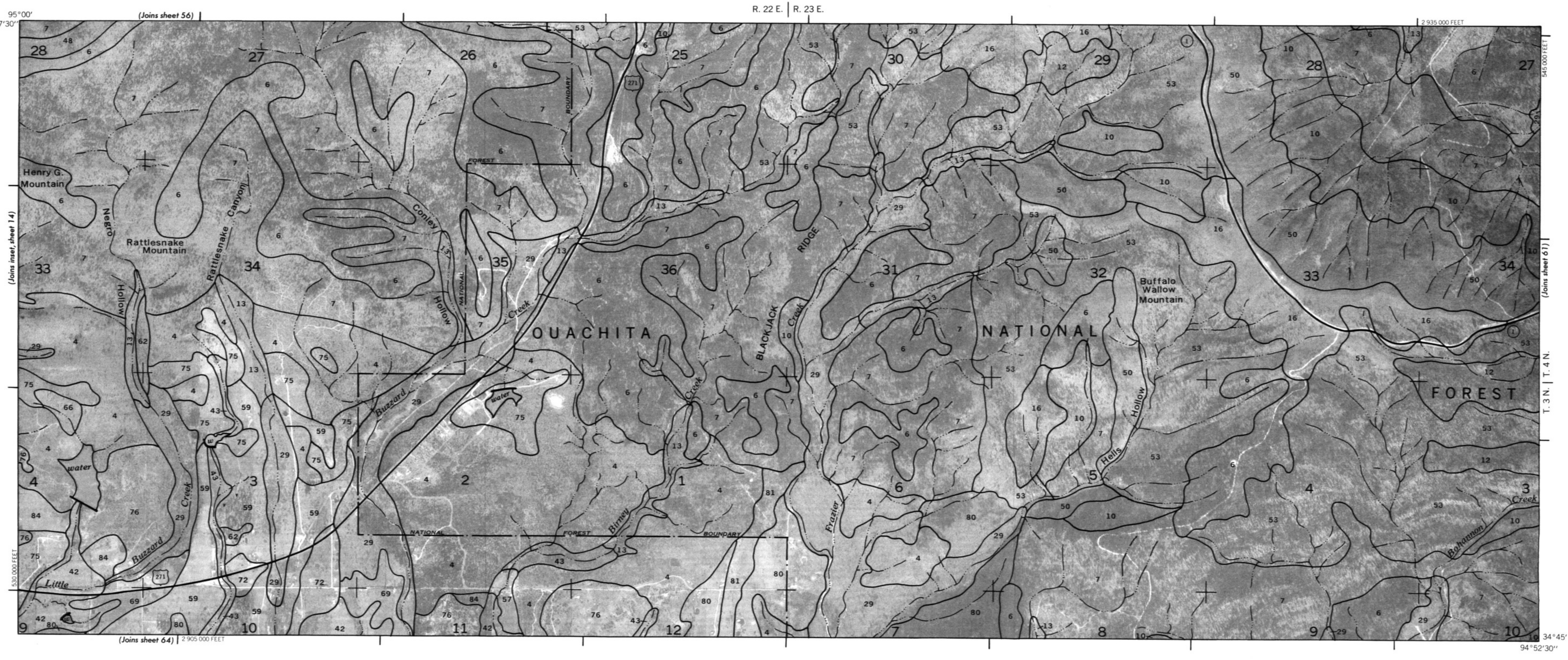
LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 58




N
R. 25 E. | R. 26 E.
3 015 000 FEET
R. 26 E. | R. 27 E.
(Joins sheet 55)
94°30′
34°50′
560 000 FEET
T. 4 N.
(Joins sheet 58)
(Joins inset, sheet 18)
550 000 FEET
34°47′30″
94°37′30″
(Joins sheet 63)
3 050 000 FEET
NATIONAL
FOREST
BOUNDARY
OUACHITA
NATIONAL
FOREST
WALKER
MOUNTAIN
WALKER
MOUNTAIN
Creek
Honubby
Cedar
Creek
Black
Fork
5 000
4 000
3 000
2 000
1 000
0
5 000
10 000 Feet
1
.5
0
1
2
3 Kilometers
Scale - 1:24 000

N

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 60

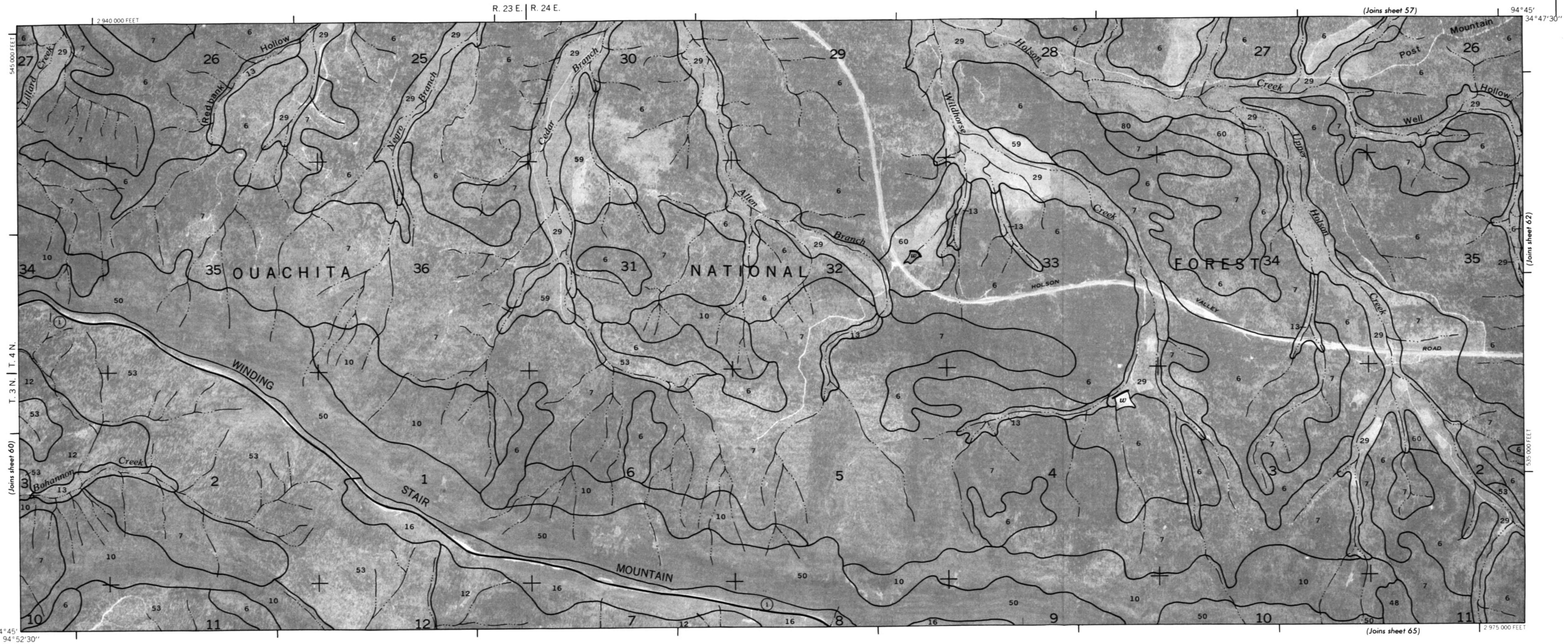


(Joins sheet 56)

Scale - 1:24 000

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

1 .5 0 1 2 3 Kilometers

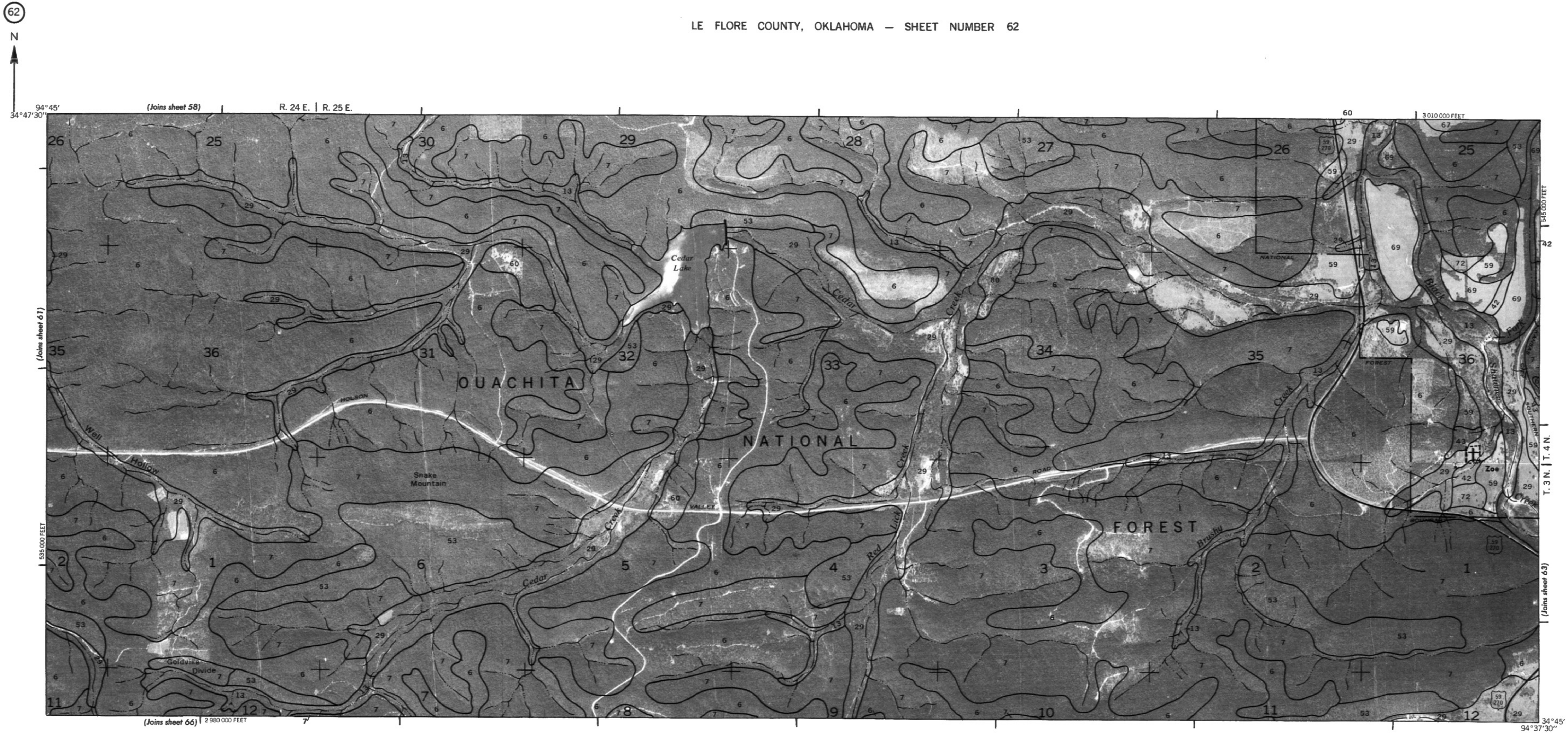


5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

Scale - 1:24000

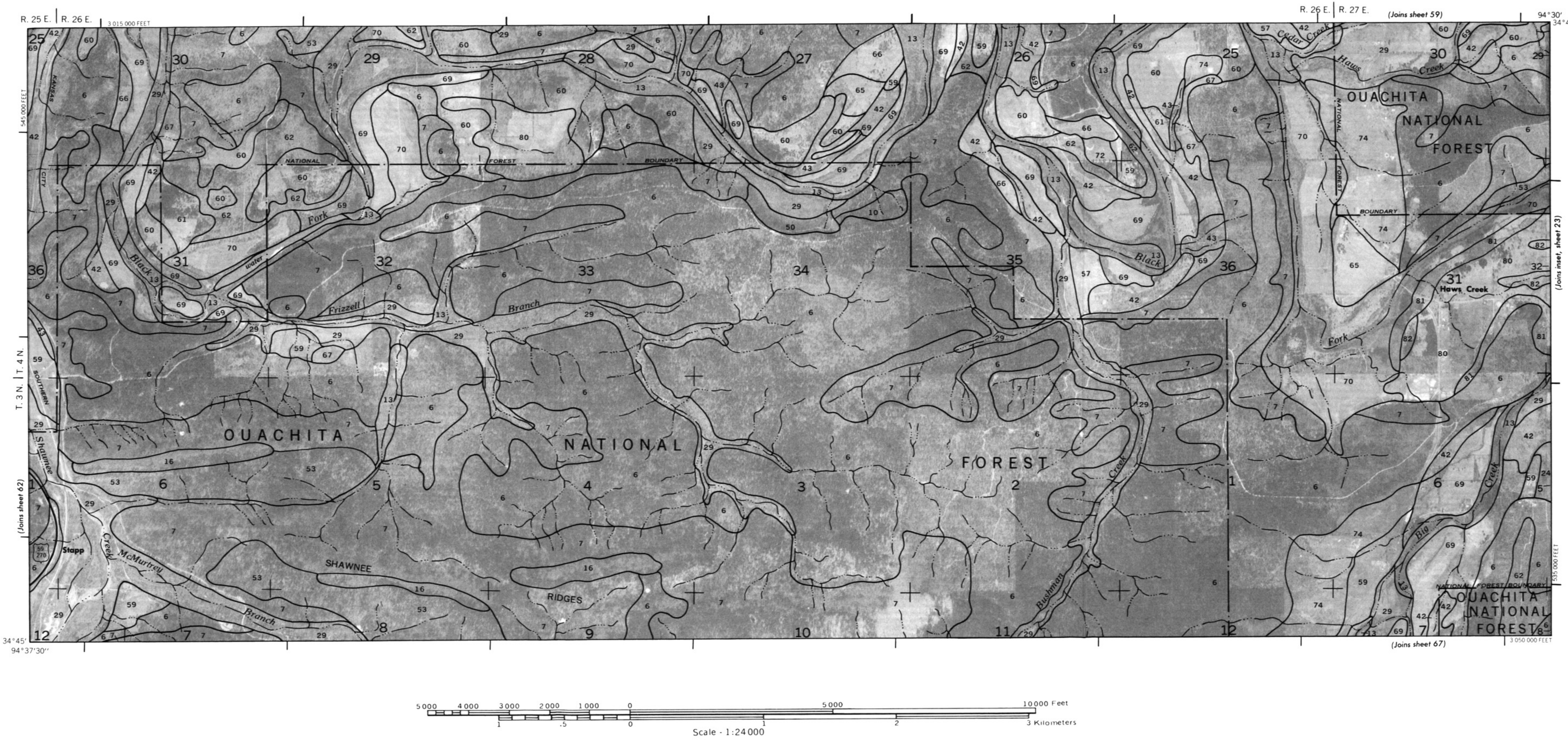
LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 62



5000 4000 3000 2000 1000 0 5000 10000 Feet

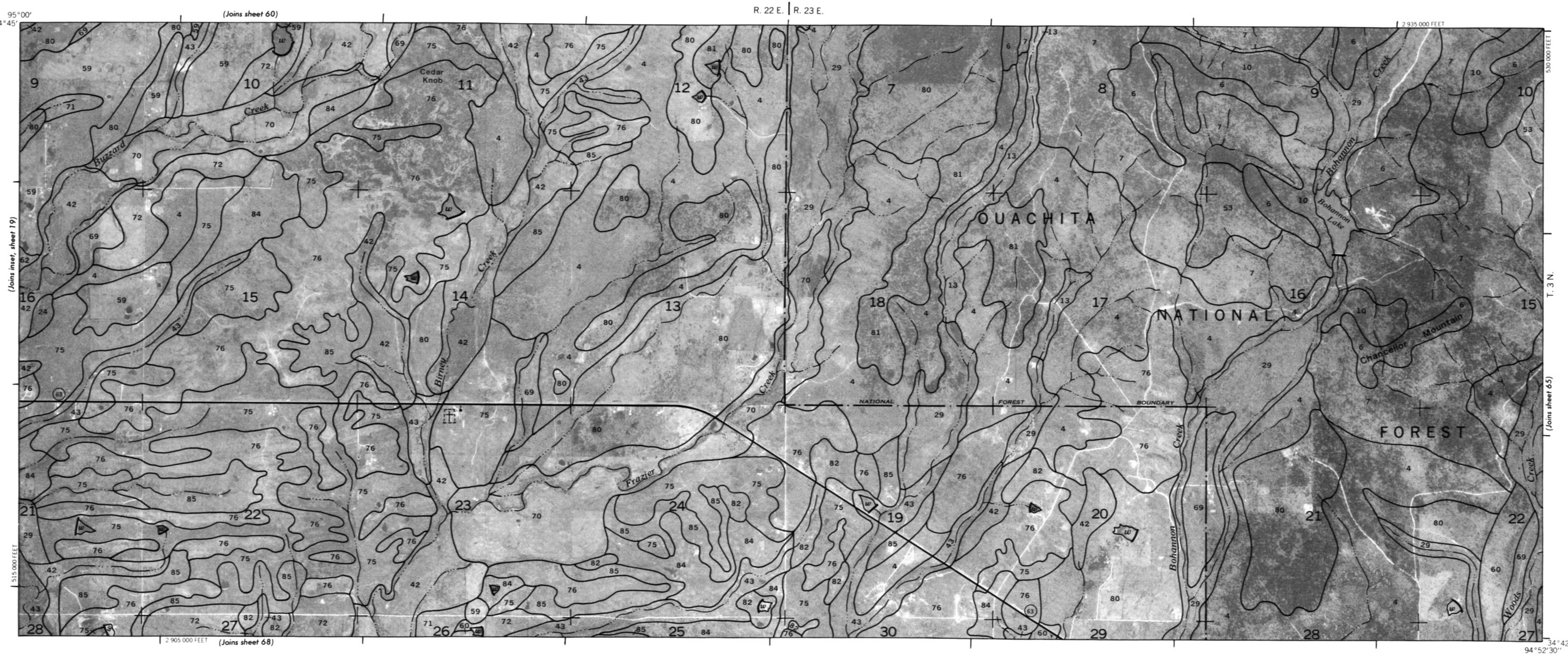
1 .5 0 1 2 3 Kilometers

Scale - 1:24000


N
R. 25 E. | R. 26 E.
R. 26 E. | R. 27 E.
(Joins sheet 59)
94°30′
34°47′30″
3 015 000 FEET
545 000 FEET
T. 4 N.
T. 3 N.
(Joins sheet 62)
(Joins inset, sheet 23)
(Joins sheet 67)
34°45′
94°37′30″
3 050 000 FEET
535 000 FEET
OUACHITA NATIONAL FOREST
NATIONAL FOREST BOUNDARY
OUACHITA NATIONAL FOREST
SHAWNEE RIDGES
Black Fork
Frizzell Branch
Haws Creek
Cedar Creek
Big Creek
Black Creek
Bushman Creek
McMurtrey Branch
Shawnee Creek
Stapp
KANSAS CITY SOUTHERN
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 64

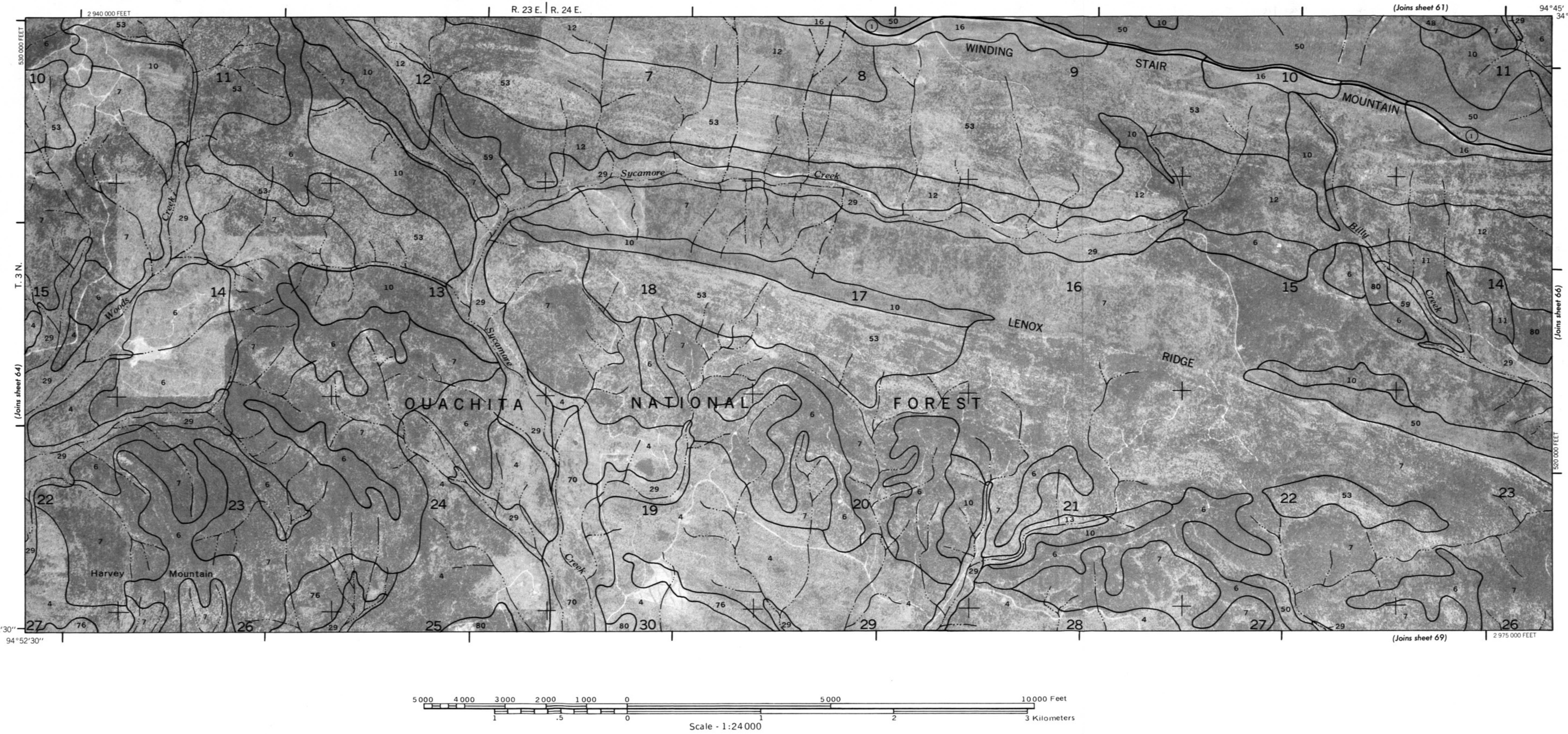


5000 4000 3000 2000 1000 0 5000 10000 Feet

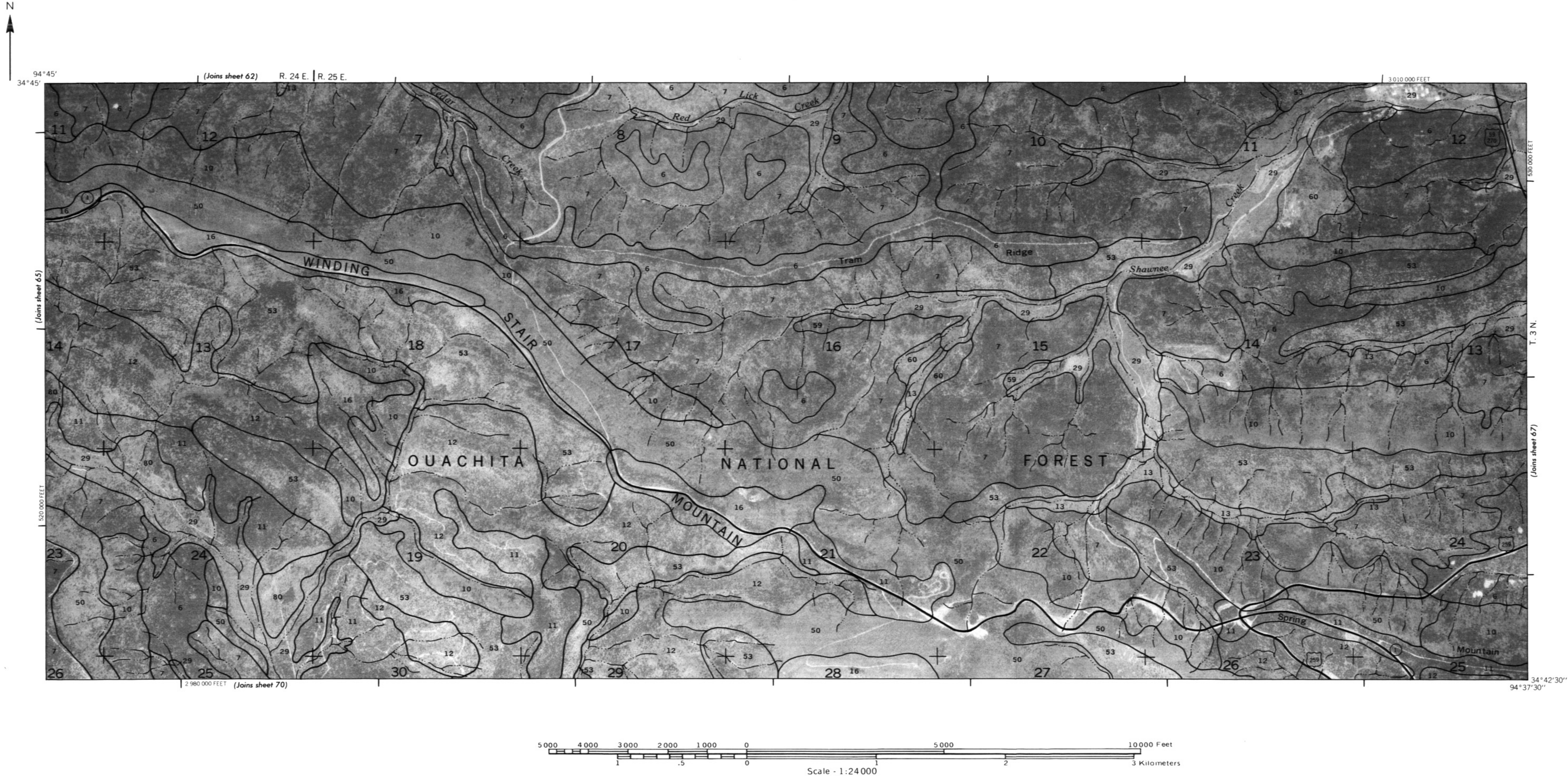
1 .5 0 1 2 3 Kilometers

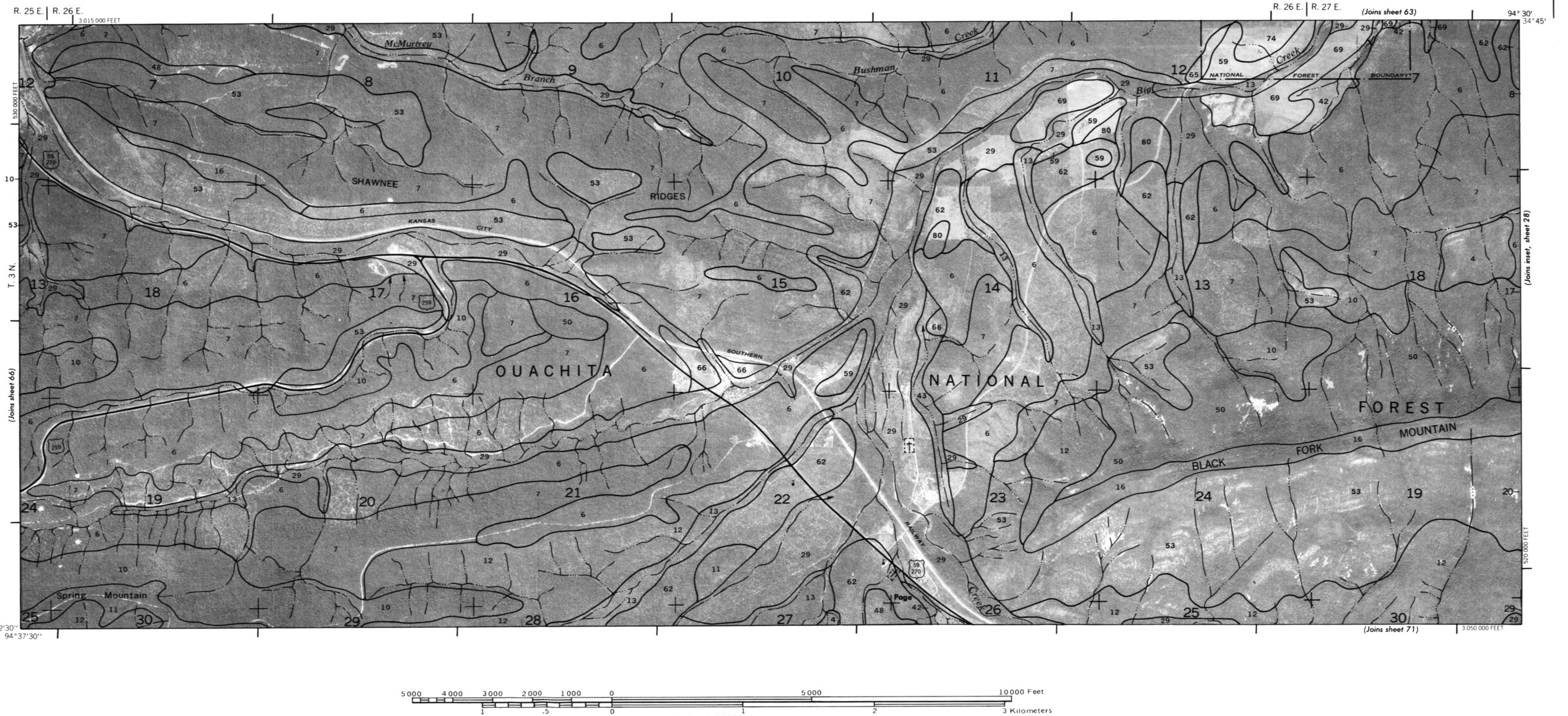
Scale - 1:24 000

N

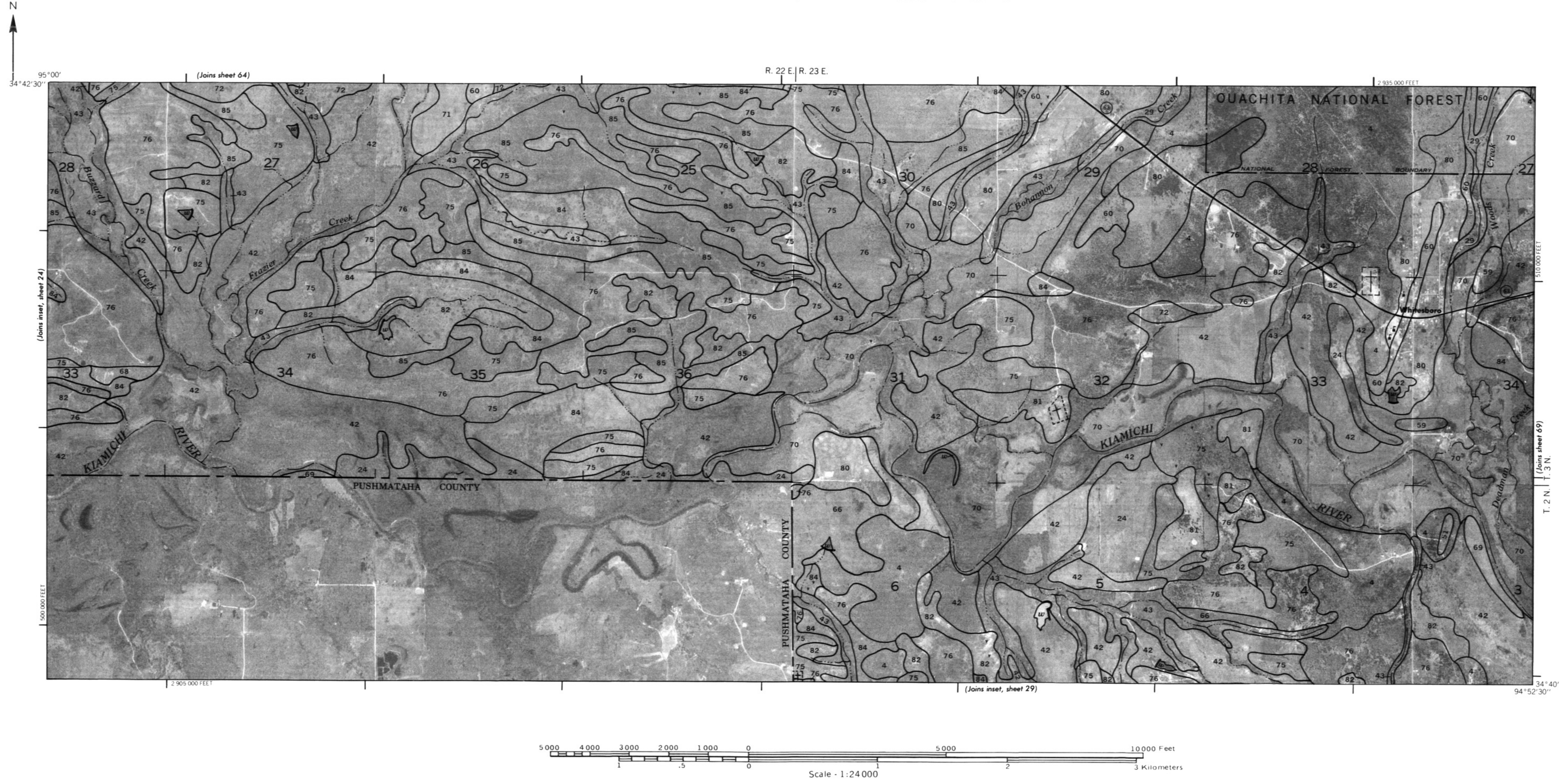


R. 23 E. | R. 24 E.
2 940 000 FEET
(Joins sheet 61)
94°45′
34°45′
530 000 FEET
T. 3 N.
(Joins sheet 64)
(Joins sheet 66)
520 000 FEET
34°42′30″
94°52′30″
(Joins sheet 69)
2 975 000 FEET
WINDING STAIR MOUNTAIN
LENOX RIDGE
OUACHITA NATIONAL FOREST
Sycamore Creek
Woods Creek
Billy Creek
Harvey Mountain
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

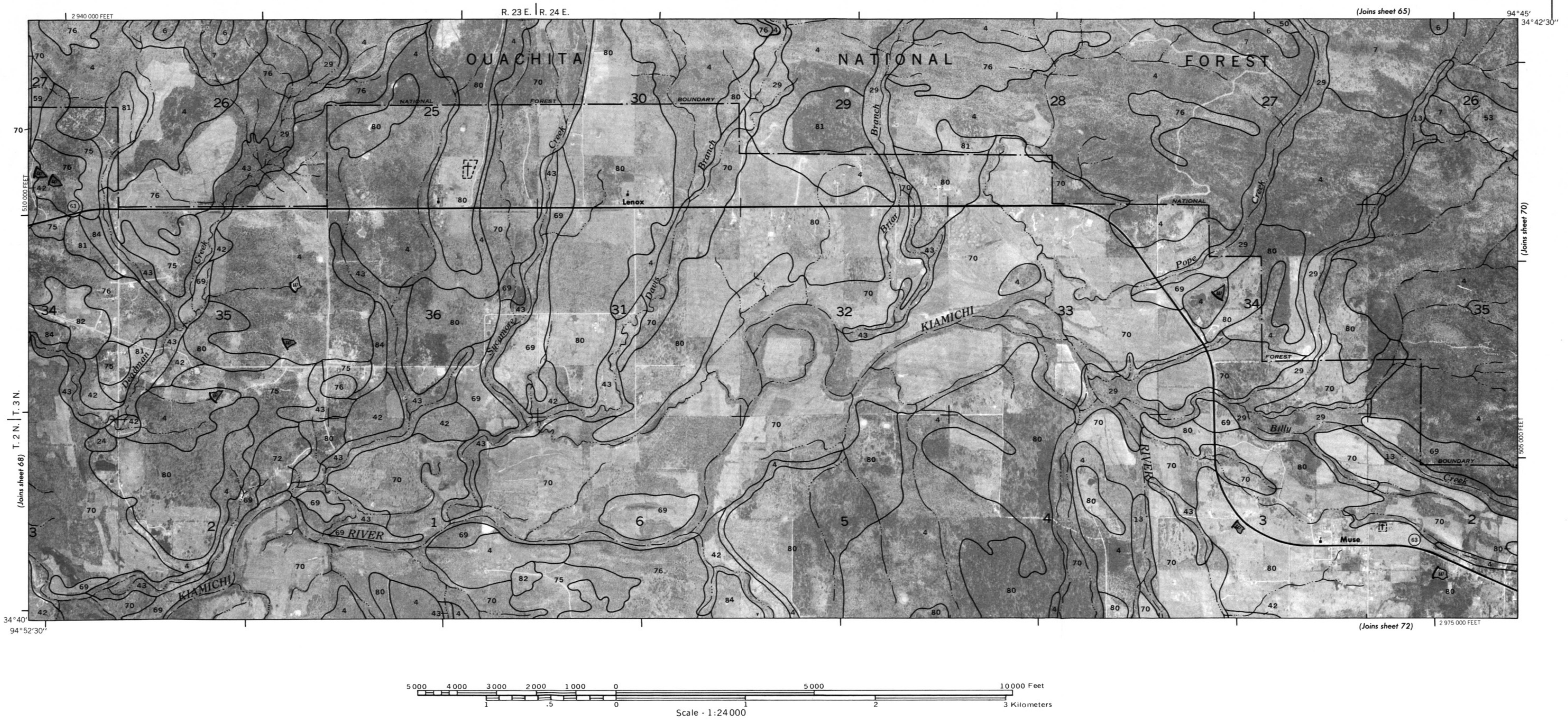

N
94°45′
34°45′
(Joins sheet 62)
R. 24 E.
R. 25 E.
3 010 000 FEET
530 000 FEET
(Joins sheet 65)
(Joins sheet 67)
T. 3 N.
520 000 FEET
2 980 000 FEET
(Joins sheet 70)
34°42′30″
94°37′30″
WINDING
STAIR
MOUNTAIN
OUACHITA
NATIONAL
FOREST
Tram
Ridge
Shawnee
Creek
Red
Lick
Cedar
Spring
Mountain
5 000
4 000
3 000
2 000
1 000
0
5 000
10 000 Feet
1
.5
0
1
2
3 Kilometers
Scale - 1:24 000


N
R. 25 E. | R. 26 E.
3 015 000 FEET
R. 26 E. | R. 27 E.
(Joins sheet 63)
94° 30′
34° 45′
530 000 FEET
T. 3 N.
(Joins sheet 66)
(Joins inset, sheet 28)
520 000 FEET
34° 42′30″
94° 37′30″
(Joins sheet 71)
3 050 000 FEET
McMurtrey Branch
Bushman Creek
Big Creek
NATIONAL FOREST BOUNDARY
SHAWNEE RIDGES
KANSAS CITY SOUTHERN RAILWAY
OUACHITA NATIONAL FOREST
BLACK FORK MOUNTAIN
Spring Mountain
Page
Creek
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

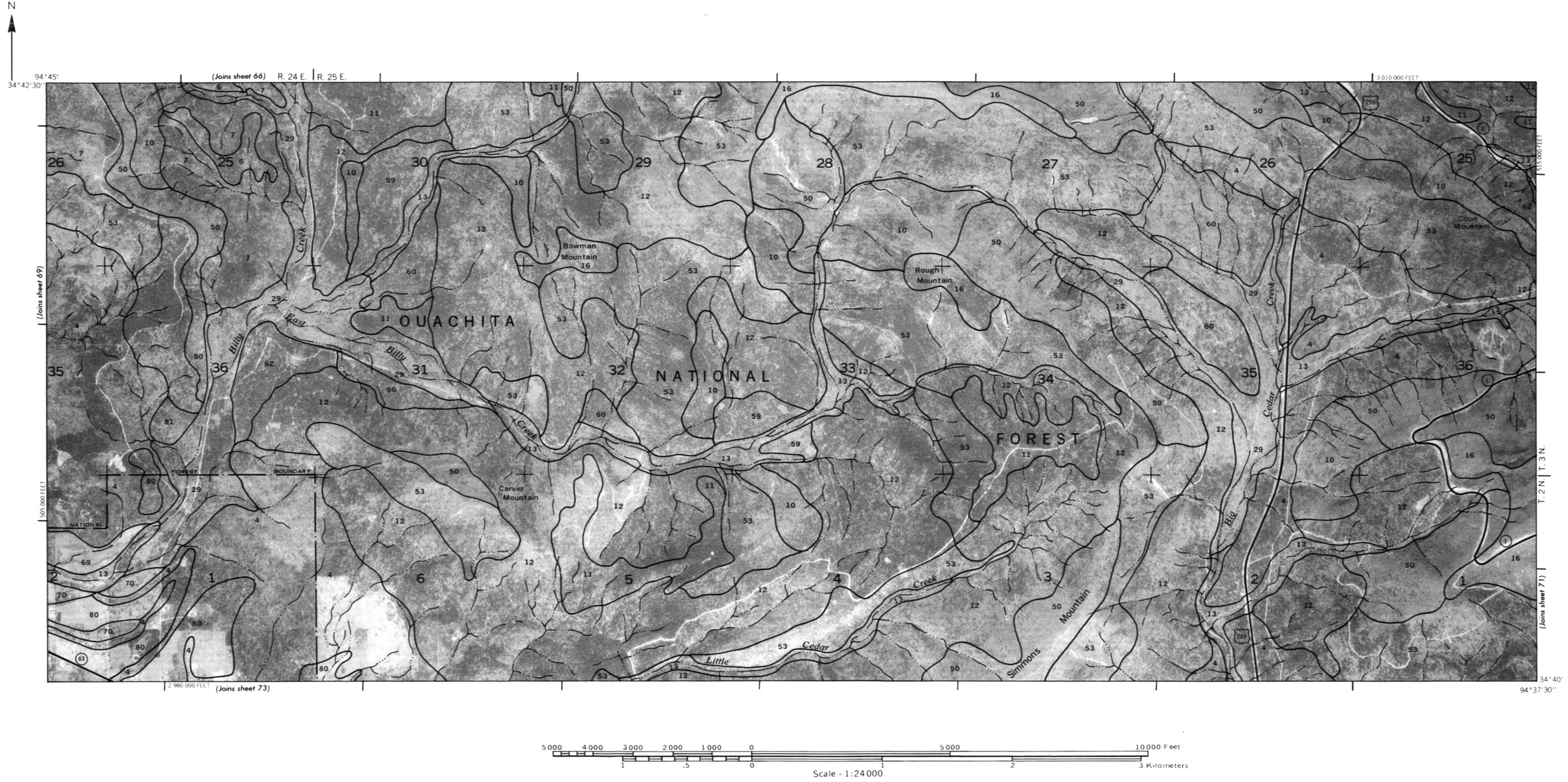
LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 68

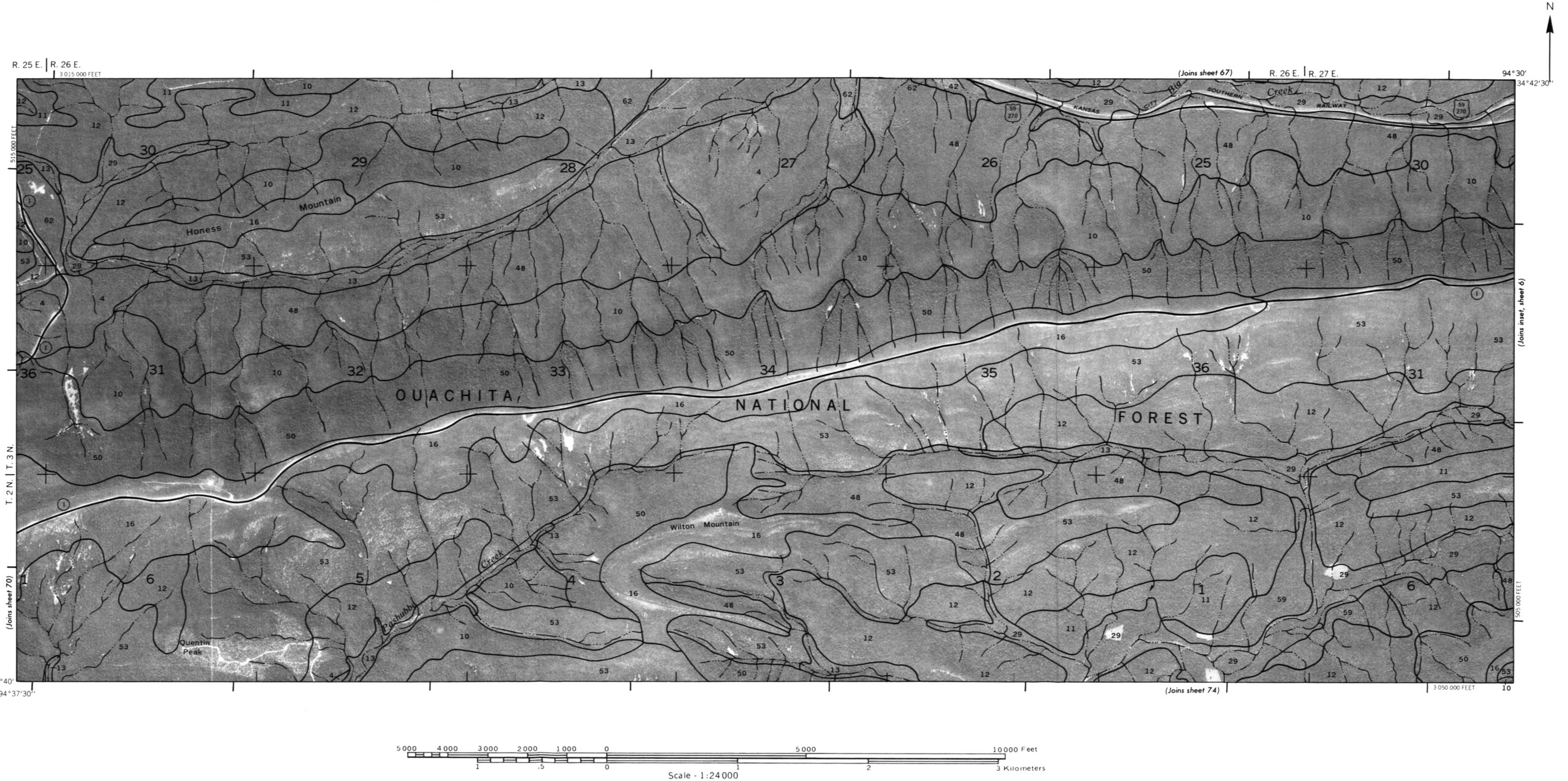


LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 69



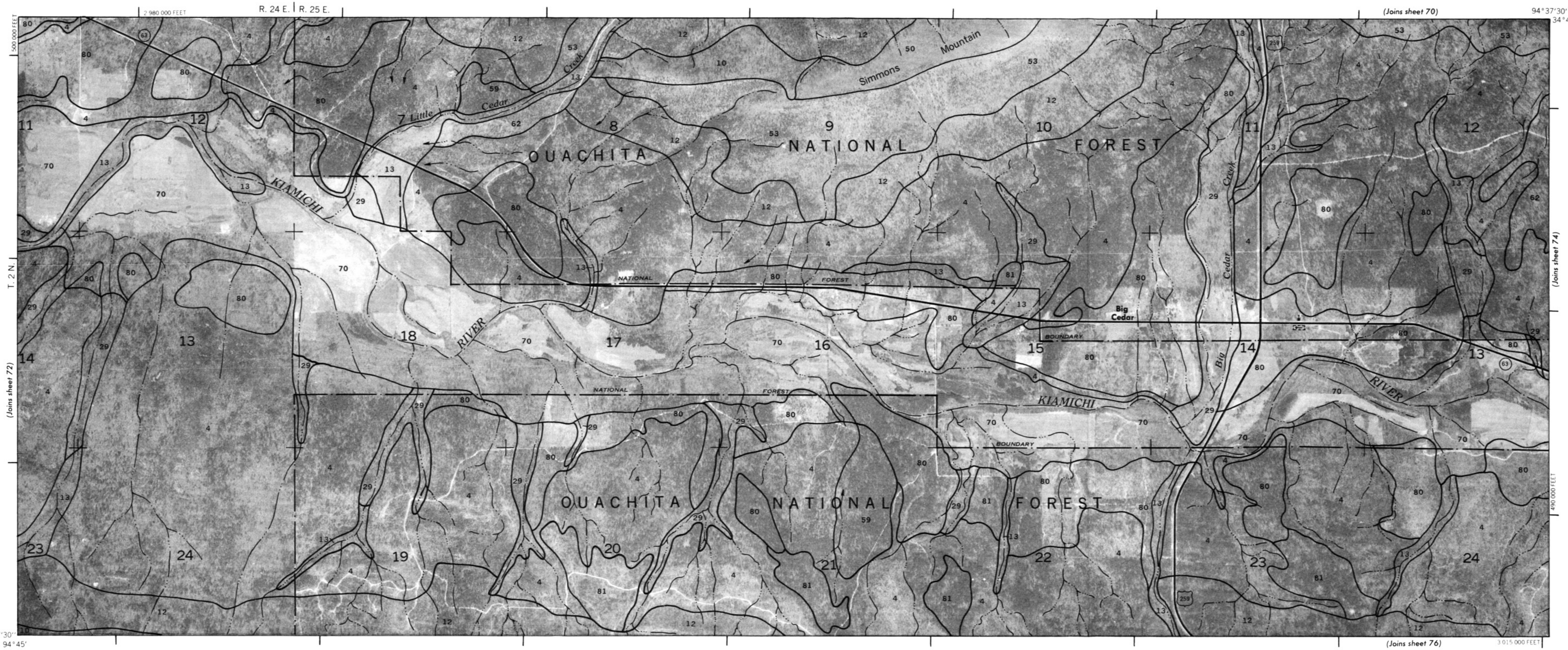
LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 70




N
R. 25 E. | R. 26 E.
3 015 000 FEET
(Joins sheet 67)
R. 26 E. | R. 27 E.
94°30′
34°42′30″
515 000 FEET
Honess Mountain
KANSAS CITY SOUTHERN RAILWAY
Big Creek
59 270
OUACHITA NATIONAL FOREST
Wilton Mountain
Pashubbe Creek
Quentin Peak
T. 2 N. | T. 3 N.
(Joins sheet 70)
(Joins inset, sheet 6)
505 000 FEET
34°40′
94°37′30″
(Joins sheet 74)
3 050 000 FEET
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000


N
94°52'30"
34°40'
(Joins sheet 69)
R. 23 E.
R. 24 E.
2 975 000 FEET
500 000 FEET
(Joins inset, sheet 29)
(Joins sheet 73)
T. 2 N.
KIAMICHI RIVER
KIAMICHI
RIVER
Gensey Branch
Patterson Creek
Robinson Ridge
TOMBSTONE MOUNTAIN
KIAMICHI MOUNTAIN
Little Mountain
485 000 FEET
2 940 000 FEET
(Joins sheet 75)
34°37'30"
94°45'
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

N



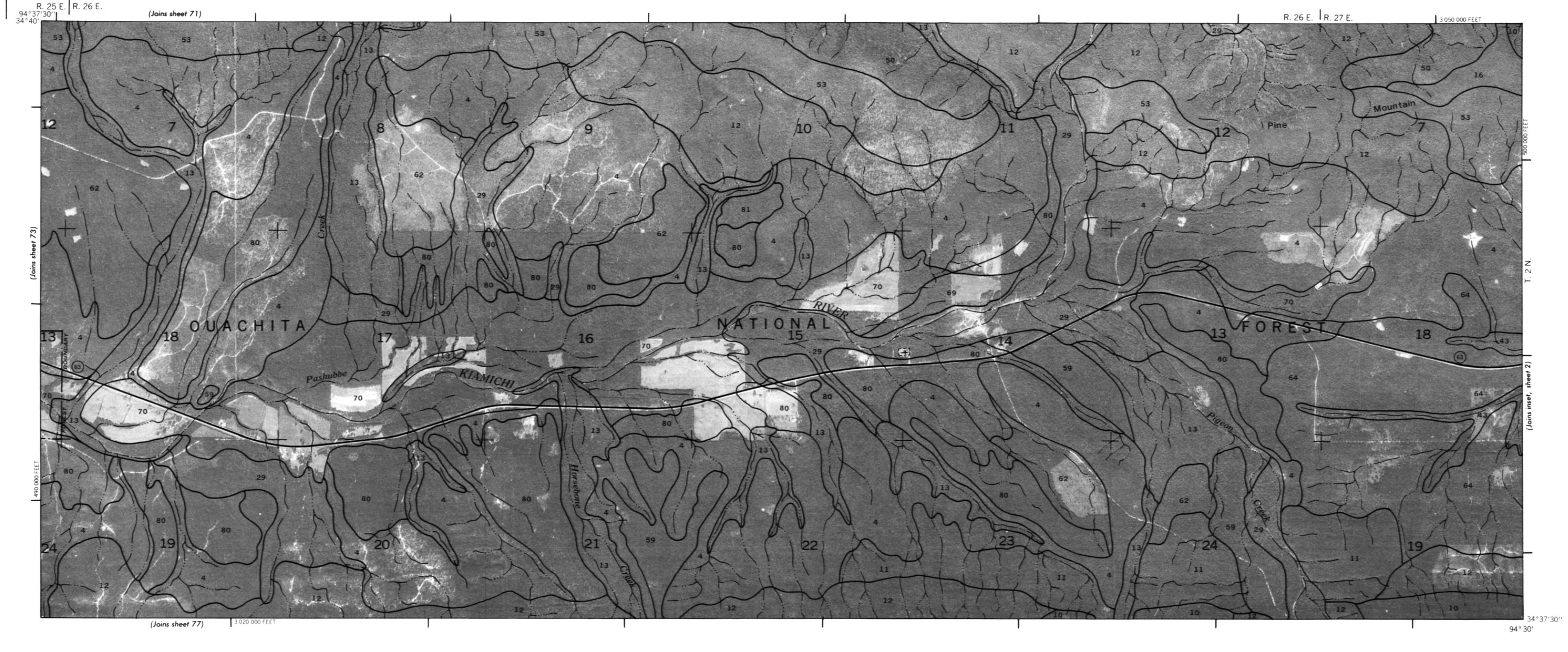
5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

Scale - 1:24 000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 74

N



5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

1 .5 0 1 2 3 Kilometers

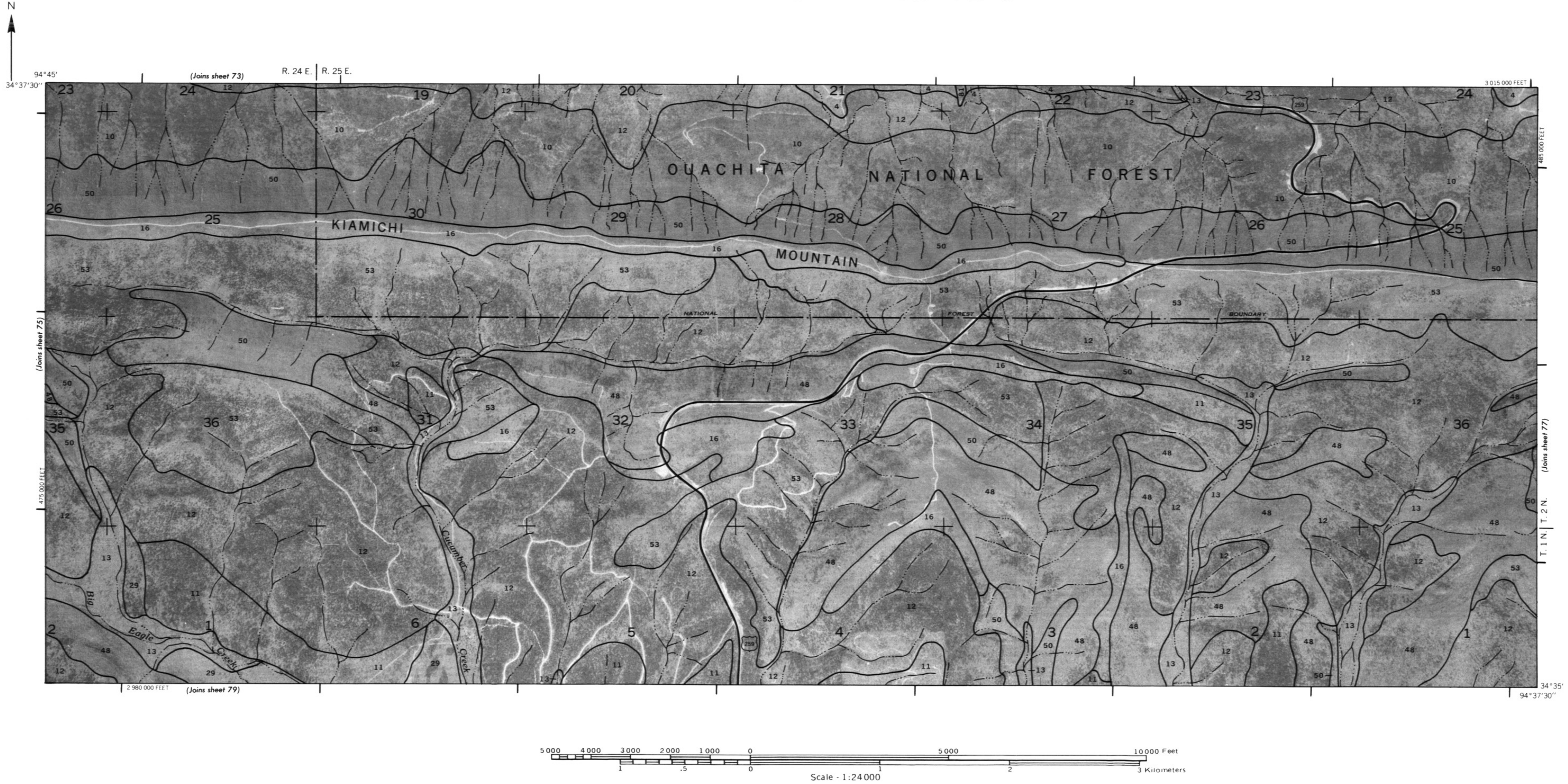
Scale - 1:24 000

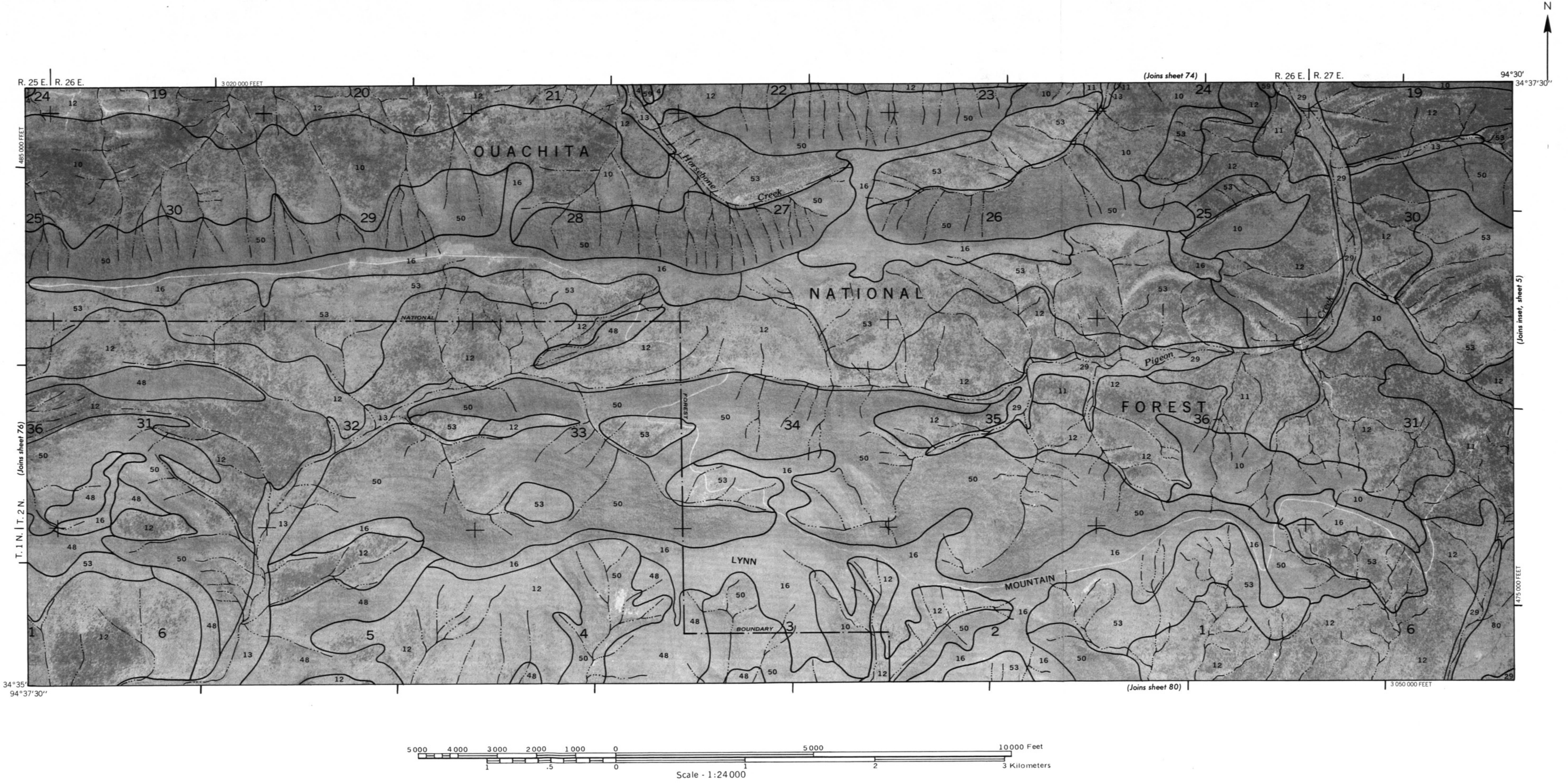
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

1 .5 0 1 2 3 Kilometers

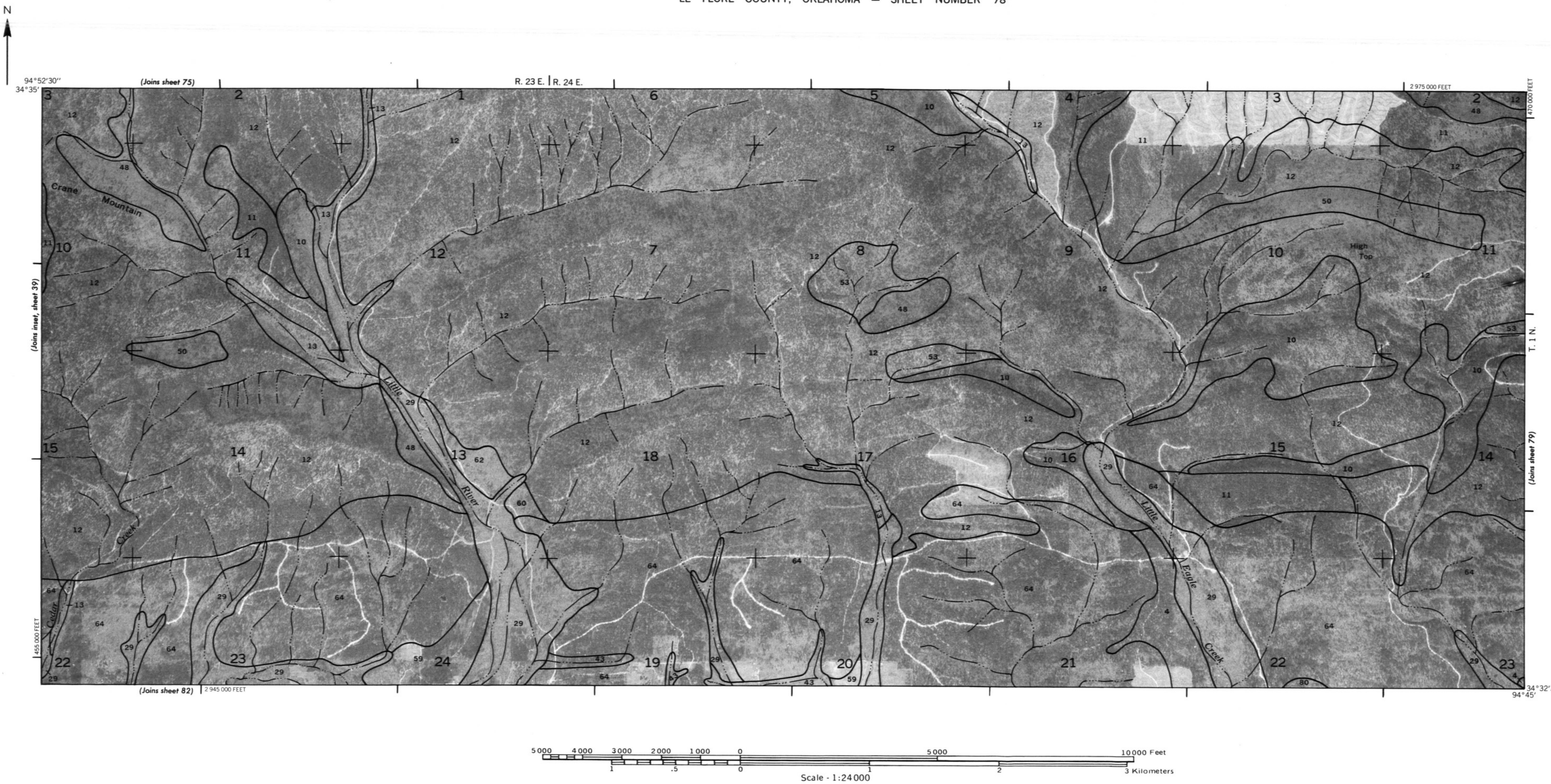
Scale - 1:24 000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 76




N
R. 25 E. R. 26 E.
3 020 000 FEET
(Joins sheet 74)
R. 26 E. R. 27 E.
94°30′
34°37′30″
485 000 FEET
OUACHITA
NATIONAL
FOREST
Horseshoe Creek
Pigeon Creek
LYNN MOUNTAIN
BOUNDARY
(Joins sheet 76)
(Joins inset, sheet 5)
T. 1 N. T. 2 N.
475 000 FEET
34°35′
94°37′30″
(Joins sheet 80)
3 050 000 FEET
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 78

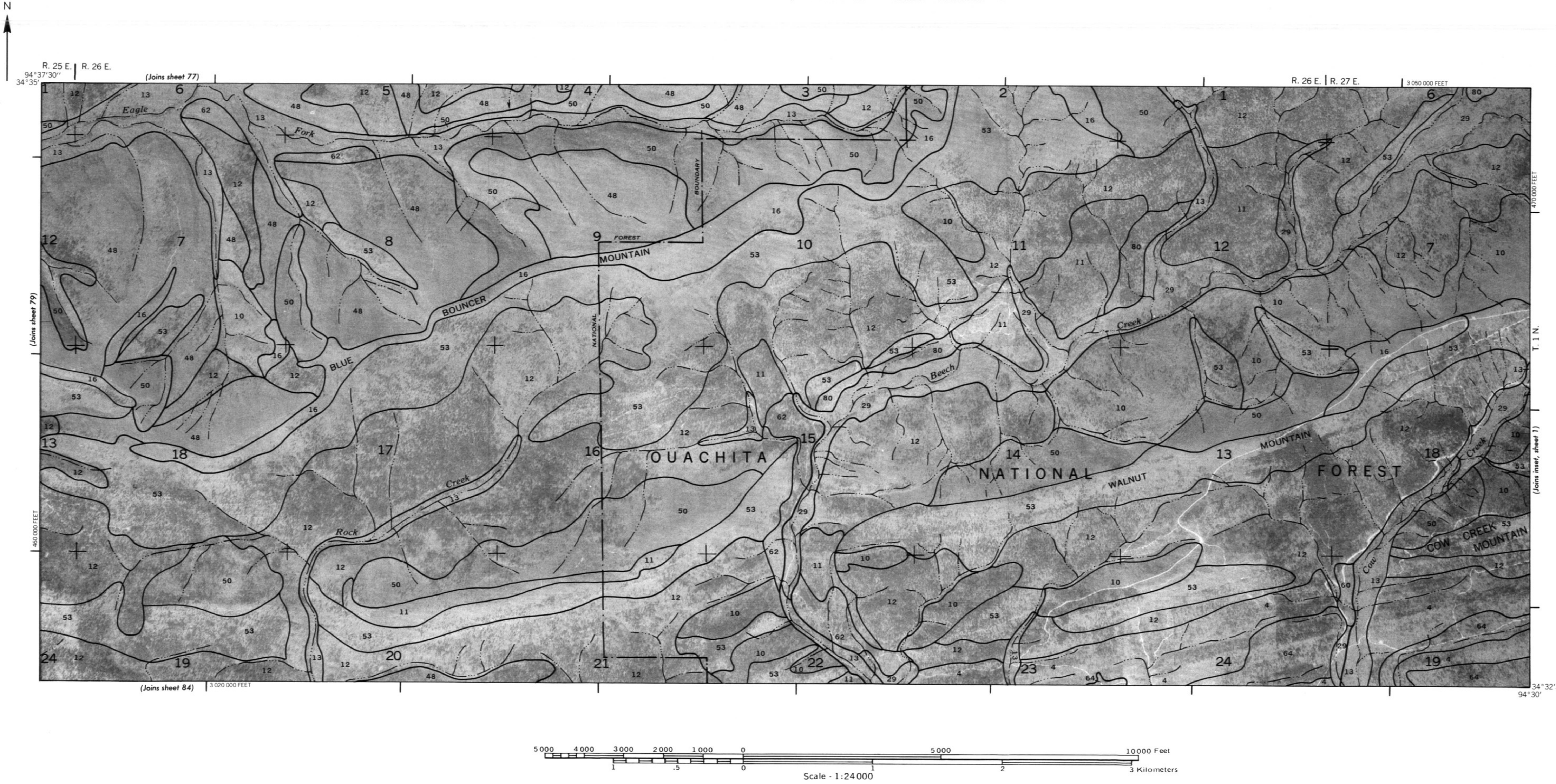


N

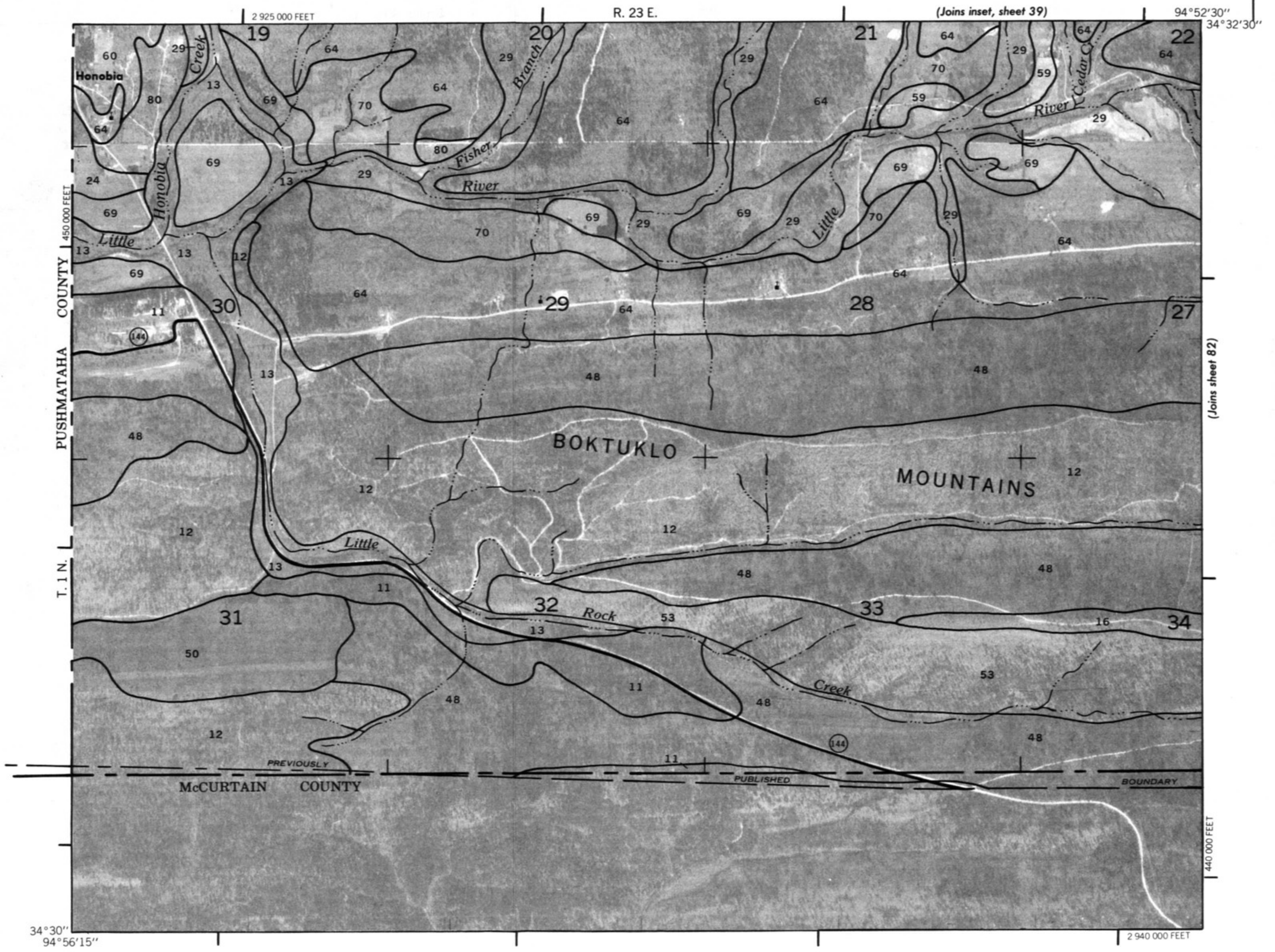
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers

Scale - 1:24 000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 80



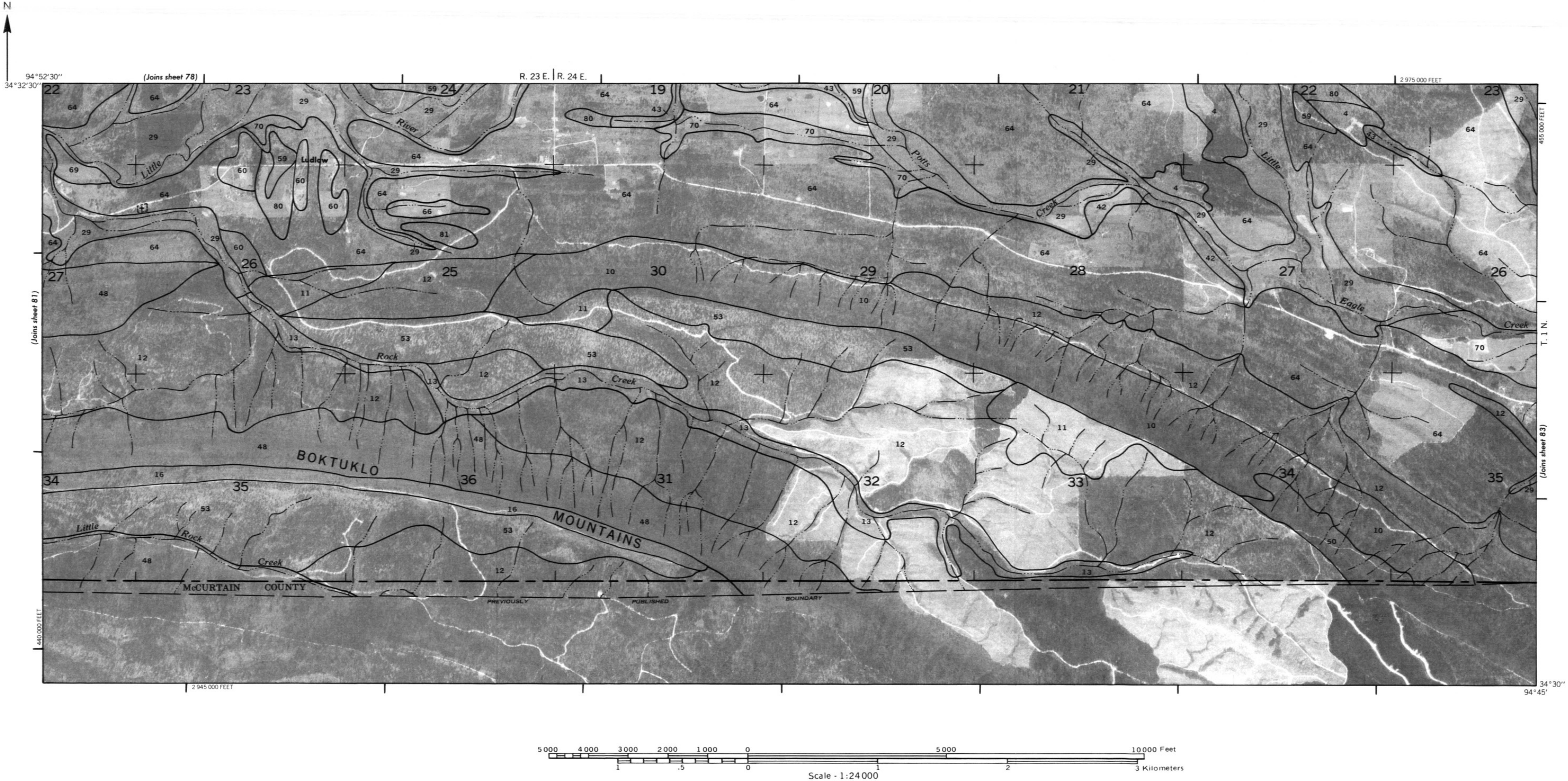
N



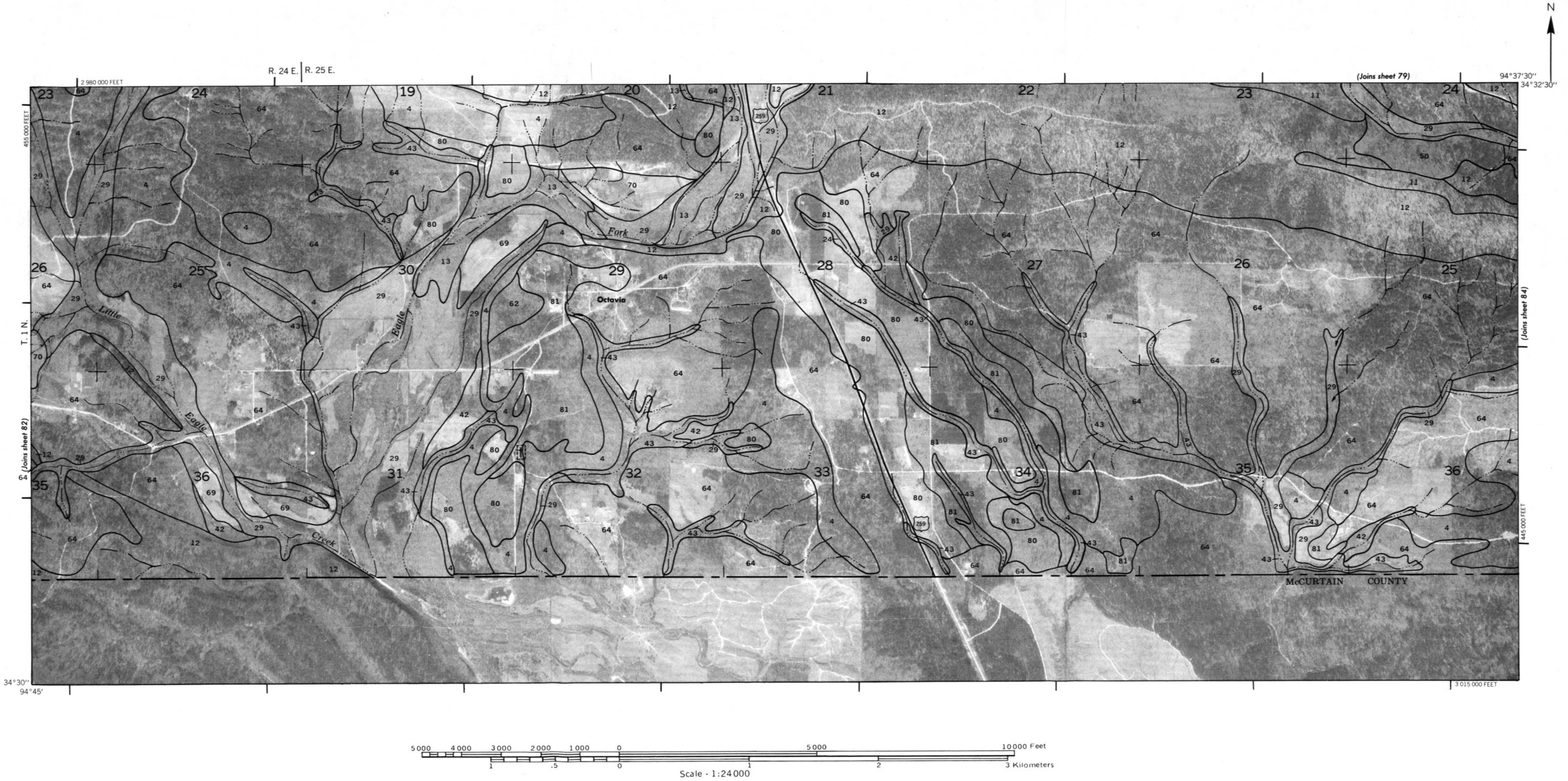
Scale - 1:24000

(82)

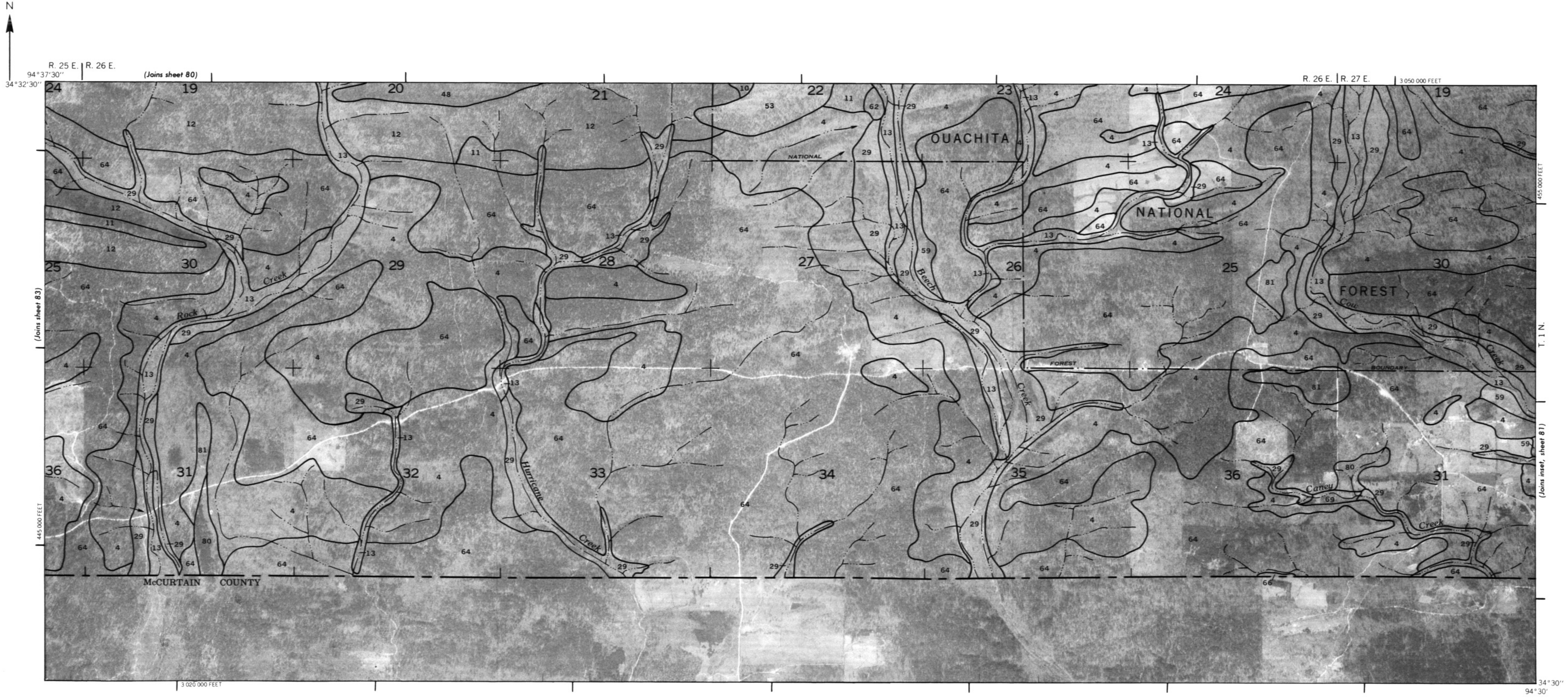
LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 82



Scale - 1:24000


N
R. 24 E.
R. 25 E.
T. 1 N.
2 980 000 FEET
455 000 FEET
445 000 FEET
3 015 000 FEET
(Joins sheet 79)
(Joins sheet 84)
(Joins sheet 82)
94°37′30″
34°32′30″
34°30″
94°45′
Octavia
Little
Eagle
Creek
Fork
McCURTAIN COUNTY
259
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

LE FLORE COUNTY, OKLAHOMA — SHEET NUMBER 84



5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

Scale - 1:24000